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INJURY PREVENTION REPORT NO. 12-HF-0893-10
INJURY INCIDENCE AND INJURY RISK FACTORS AMONG SOLDIERS IN THE U.S. ARMY ORDNANCE SCHOOL ABERDEEN PROVING GROUND, MARYLAND JANUARY 2000–JUNE 2003

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14. ABSTRACT

This study examined risk factors for time-loss injuries during U.S. Army Ordnance School Advanced Individual Training (AIT). Participants were soldiers (n= 3757 men, n=498 women) attending Ordnance AIT from January 2000 to June 2003. Injuries were obtained from an injury surveillance system in the medical clinic serving the AIT soldiers. Potential injury risk factors included entry-level fitness, demographics, and lifestyle variables. Fitness variables included maximal effort performance on push-ups, sit-ups and a 2-mile run. A health questionnaire provided data on age, race, rank, current self reported injury, current self reported illness, and tobacco use. Fitness variables were converted to four quartiles (Q) based on the distribution of scores (Q1=high performance to Q4=low performance). AIT entry and completion dates were obtained from an Army personnel system. Backward stepping Cox regression examined associations between time-loss injury and potential injury risk factors. Multivariate hazard ratios (MHR) and 95% confidence intervals (95%CI) were calculated. Cumulative time-loss injury incidence was 31% for men and 54% for women. For men, higher risk of injury resulting in time-loss was independently associated with race (MHR (Native American/Caucasian) = 1.4, 95%CI = 1.1-1.7), a current self reported injury (MHR (yes/no) = 2.2, 95%CI = 1.8-2.7), smoking before entering the Army (MHR (≤10 cigarettes/nonsmokers) = 1.3, 95%CI = 1.0-1.5, MHR (10-20 cigarettes/nonsmokers)= 1.5, 95%CI=1.2-1.7, MHR (>20 cigarettes/nonsmokers) = 1.9, 95%CI = 1.6-2.2), lower sit-up performance (MHR (Q4/Q1) = 1.2, 95%CI = 1.0-1.5), and slower 2-mile run times (MHR (Q4/Q1)= 1.4, 95%CI = 1.2-1.7). For women, higher risk of injury was independently associated with race (MHR (Black/Caucasian) = 0.7, 95%CI = 0.5-0.9), a current self reported injury (MHR (yes/no) = 1.6, 95%CI = 1.1-2.3), and slower 2-mile run times (MHR (Q4/Q1) = 2.2, 95%CI = 1.5-3.1). Risk factors for time-loss injury in Ordnance AIT for both men and women included race, current self reported injuries, and lower aerobic fitness. Smoking cessation classes and fitness training prior to entry are potential strategies to reduce injuries among soldiers in Ordnance School AIT.

15. SUBJECT TERMS
Injury, smokeless tobacco, tobacco, military, ordnance school

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EXECUTIVE SUMMARY
INJURY PREVENTION REPORT NO. 12-HF-0893-10
INJURY INCIDENCE AND INJURY RISK FACTORS AMONG SOLDIERS IN THE U.S. ARMY ORDNANCE SCHOOL ABERDEEN PROVING GROUND, MARYLAND JANUARY 2000–JUNE 2003

1. PURPOSE. From January 2000 to June 2003, the U.S. Army Public Health Command (Provisional), formerly known as the U.S. Army Center for Health Promotion and Preventive Medicine, and the Kirk U.S. Army Health Clinic collaborated with the 143rd Ordnance Battalion at Aberdeen Proving Ground (APG), Maryland to identify injuries and injury risk factors during advanced individual training (AIT). This report provides the results of this collaboration by addressing injury rates and injury risk factors among Soldiers in AIT at the Ordnance School.

2. METHODS.

a. Participants were Army Service members attending AIT at the Edgewood Area of APG from January 2000 to June 2003. These Service members were training to qualify for one of five different Military Occupational Specialties (MOSs). These MOSs included track vehicle repairer (MOS 63H), wheeled vehicle repairer (MOS 63W), self-propelled field artillery system mechanic (MOS 63D), fuel and electrical system repairer (MOS 63G), and track vehicle mechanic (MOS 63Y).

b. On arrival at APG, each Service member was asked to complete a Soldier health in-processing questionnaire. The questionnaire included questions about the demographics and lifestyle characteristics of Service members. Information requested included whether or not the student currently had an injury or illness perceived to affect their AIT performance, history of tobacco use, date of birth, gender, rank, race, and basic combat training (BCT) location. Army Physical Fitness Test (APFT) data were obtained from the 143rd Ordnance Battalion Training and Operations (S-3) office.

c. Injuries occurring during training were obtained from an injury surveillance system in the medical clinic serving the AIT Soldiers. Every time a Soldier reported to the medical clinic, a medical provider would fill out an injury sheet. The injury sheet had boxes for the medical provider to check that indicated the type of injury that had occurred and the number of profile or quarter days given to the Soldier. Injuries from the data sheet were classified into four categories: time-loss injuries, overuse time-loss injuries, lower extremity overuse time-loss injuries and traumatic time-loss injuries. Time-loss injuries include an injury of any type plus a profile of one or more days.

d. The Statistical Package for the Social Sciences, Version 16.0, was used for statistical analysis. Potential risk factors for time-loss injuries, overuse time-loss injuries, lower extremity overuse time-loss injuries and traumatic time-loss injuries were explored using Cox regression (separate models were developed for each injury category). Hazard ratios and 95 percent confidence intervals (CIs) were calculated for each potential injury risk factor. Variables from the univariate analysis with a statistical significance of $p \leq 0.10$ were selected for a backward-stepping multivariate Cox regression. Multivariate hazard ratios (MHRs) and 95 percent CIs were calculated. For the Cox regression, APFT scores were converted to four quartiles (Qs) based on the distribution of scores where Q1 = high performance and Q4=low performance.

3. RESULTS.

a. There were 3757 men and 498 women involved with the project. A majority of the subjects were Caucasian men between the ages of 17 and 19 who had attended BCT at Fort Knox and were wheeled vehicle repairers (MOS 63W) of lower military rank (E1) and nonsmokers and non-smokeless tobacco users. During the course of their Ordnance School training, 31 percent of men and 54 percent of women had one or more time-loss injuries; the time-loss injury rate for men over this time period was 34.9 injuries/10,000 person-days, and the rate for women was 60.8 injuries/10,000 person-days.

b. Multivariate logistic regression results follow.

(1) Time-Loss Injury.

(a) For men, a higher risk of time-loss injury was associated with the Native American race (MHR (Native American/Caucasian) = 1.4, 95 percent CI = 1.1–1.7); a current self-reported injury (MHR (yes/no) = 2.2, 95 percent CI = 1.8–2.7); smoking before entering the Army (MHR (≤10 cigarettes/nonsmokers) = 1.3, 95 percent CI = 1.0–1.5, MHR (10-20 cigarettes/nonsmokers) = 1.5, 95 percent CI = 1.2–1.7, MHR (>20 cigarettes/nonsmokers) = 1.9, 95 percent CI = 1.6–2.2); lower sit-up performance (MHR (Q4/Q1) = 1.2, 95 percent CI = 1.0–1.5); and slower 2-mile run times (MHR (Q4/Q1) = 1.4, 95 percent CI = 1.2–1.7).

(b) For women, a higher risk of time-loss injury was associated with Caucasian race (MHR (Black/Caucasian) = 0.7, 95 percent CI = 0.5–0.9); a current self-reported injury (MHR (yes/no) = 1.6, 95 percent CI = 1.1–2.3); and slower 2-mile run times (MHR (Q4/Q1) = 2.2, 95 percent CI = 1.5–3.1).

(2) Overuse Time-Loss Injury.

(a) For men, a higher risk of overuse time-loss injury was associated with MOS (MHR (fuel and electrical system repairer (MOS 63G)/track vehicle repairer (MOS 63H)) = 1.5, 95 percent CI = 1.1–2.1, MHR (track vehicle mechanic (MOS 63Y)/track vehicle repairer (MOS 63H)) = 1.4, 95 percent CI = 1.1–1.8); a current self-reported injury (MHR (yes/no) = 2.2, 95 percent CI = 1.8–2.8); smoking before entering the Army (MHR (10–20 cigarettes/nonsmokers) = 1.7, 95 percent CI = 1.4–2.0, MHR (>20 cigarettes/ nonsmokers) = 1.9, 95 percent CI = 1.6–2.4); lower sit-up performance (MHR (Q4/Q1) = 1.4, 95 percent CI = 1.1–1.7); and slower 2-mile run times (MHR (Q4/Q1)= 1.5, 95 percent CI = 1.2–1.8).

(b) For women, a higher risk of overuse time-loss injury was independently associated with age (MHR (20–24/17–19) = 0.73, 95 percent CI = 0.5–1.00); Caucasian race (MHR (Black/Caucasians) = 0.6, 95 percent CI = 0.4–0.9); attending basic training at Fort Leonard Wood (MHR (Fort Leonard Wood/Fort Jackson) = 1.6, 95 percent CI = 1.1–2.3); a current self-reported injury (MHR (yes/no) = 1.5, 95 percent CI = 1.0–2.1); and slower 2-mile run times (MHR (Q4/Q1)= 2.0, 95 percent CI = 1.3–2.9).

(3) Lower Extremity Overuse Time-Loss Injury.

(a) For men, a higher risk of time-losslower extremity overuse time-loss injury was associated with a current self-reported injury (MHR (yes/no) = 2.0, 95 percent CI = 1.5–2.5); smoking before entering the Army (MHR (10–20 cigarettes/nonsmokers) = 1.7, 95 percent CI = 1.4–2.1, MHR (>20 cigarettes/nonsmokers) = 2.1, 95 percent CI = 1.7–2.6); lower sit-up performance (MHR (Q4/Q1) = 1.5, 95 percent CI = 1.1–1.9); and slower 2-mile run times (MHR (Q4/Q1) = 1.5, 95 percent CI = 1.2–1.9).

(b) For women, a higher risk of time-losslower extremity overuse time-loss injury was associated with attending basic training at Fort Leonard Wood (MHR (Fort Leonard Wood/Fort Jackson) = 1.7, 95 percent CI = 1.1–2.4); and slower 2-mile run times (MHR (Q4/Q1)= 1.8, 95 percent CI = 1.2–2.7).

(4) Traumatic Time-Loss Injury.

(a) For men, a higher risk of traumatic time-loss injury was associated with the Black and Native American races (MHR (Black/Caucasians) = 1.4, 95 percent CI = 1.0–2.0), MHR (Native American/Caucasian) = 1.8, 95 percent CI = 1.2–2.8); a current self-reported injury (MHR (yes/no) = 1.6, 95 percent CI = 1.1–2.4); and smoking before entering the Army (MHR (≤10 cigarettes/nonsmokers) = 1.5, 95 percent CI = 1.0–2.2, MHR (10–20 cigarettes/nonsmokers) = 1.4, 95 percent CI = 1.0–2.0, MHR (>20 cigarettes/nonsmokers) = 1.7, 95 percent CI = 1.2–2.5).

(b) For women, a higher risk of traumatic time-loss injury was associated with a current self-reported injury (MHR (yes/no) = 2.2, 95 percent CI = 1.1–4.2).

4. DISCUSSION.

a. For men, injury risk was higher in smokers than nonsmokers in all four injury categories in consonance with previous studies in BCT. There was also a dose-response relationship showing that the risk of injury increases with the number of cigarettes smoked per day.

b. Injury risk for those with current self-reported injuries believed to adversely affect their AIT performance was approximately 2.2 times higher for men and 1.5 times higher for women (except in the traumatic injury category). Previous injury, both overuse and traumatic, put Soldiers at a higher risk for current injury. Civilian studies have also shown that those with a previous injury had a higher risk of reinjury than those who reported no previous injury.

5. CONCLUSIONS. This study identified risk factors for time-loss injury in Ordnance School AIT Soldiers. Overall, 31 percent of men and 54 percent of women involved in the project incurred at least one time-loss injury. When examining injury risk for all four injury categories, both cigarette use and self-reported injury were associated with a higher risk of injury in men. For three out of the four injury categories, self-reported injury (women), sit-ups (men) and the 2-mile run (men and women) were associated with a higher risk of injury.

6. RECOMMENDATIONS. In an effort to reduce injuries, surveillance and tracking of injuries in AIT Soldiers could alert commanders to elevated levels of injuries or to injury outbreaks. Smoking cessation classes and fitness training prior to entry are potential strategies to reduce injuries.

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1. REFERENCES**.** Appendix A contains a listing of the references used in this report.

2. PURPOSE. From January 2000 to June 2003, the U.S. Army Public Health Command (Provisional) (USAPHC (Prov)), formerly known as the U.S. Army Center for Health Promotion and Preventive Medicine (USACHPPM), and the Kirk U.S. Army Health Clinic collaborated with the 143rd Ordnance Battalion at Aberdeen Proving Ground (APG), Maryland, to identify injuries and injury risk factors during advanced individual training (AIT). This report provides the results of this collaboration by addressing injury rates and injury risk factors among Soldiers in AIT at the Ordnance School.

3. AUTHORITY. Under Army Regulation (AR) 40-5 (paragraph 2-19), USACHPPM is responsible for providing support to Army preventive medicine activities, to include interpreting surveillance data, identifying leading health problems, and assisting in prevention and control of leading health problems.[1] This project was conducted under a cooperative agreement among the 61st Ordnance Brigade, Kirk U.S. Army Health Clinic, and USACHPPM, all located at APG.

4. INTRODUCTION. Time lost from work and training due to injuries can result in decreased military readiness and can compromise mission accomplishment. In 2004, Department of Defense (DOD) Service members experienced almost 25 million days of limited duty due to injuries. The top five injuries ranked by the number of days of limited duty were lower extremity overuse (pain, inflammation and stress fractures); lower extremity fractures; upper extremity fractures; torso overuse (pain, inflammation, and stress fractures); and lower extremity sprains and strains.[2] In a U.S. Marine Corps basic training study, investigators estimated that injuries among 22,000 male recruits resulted in more than 53,000 lost training days at a cost of $16.5 million (1993 dollars).[3] Other researchers examining infantry Soldiers found that fractures resulted in an average of 103 days of limited duty, sprains an average of 17 days of limited duty, tendinitis an average of 7 days of limited duty, and strains and musculoskeletal pain an average of 3 days of limited duty.[4] In basic combat training (BCT), the incidence of injury has ranged from 21 percent to 42 percent for men and from 41 percent to 67 percent for women.[5] There are only two previous reports on injuries and injury risk factors among Soldiers in AIT. One study involved medic AIT[6] and the other investigation was an abstract reporting the preliminary results from the present project.[7]

5. BACKGROUND LITERATURE .

a. Injury Incidence and Injury Risk Factors in Basic and Advanced Individual Training.

(1) Cumulative injury incidence (proportion of trainees who experience one or more injuries during training) and injury rates (injured trainees per month) have been examined in the basic training units of the Army as well as in an Army AIT investigation.[6,8–22] These data are shown in Table 1. In October 1998, Army BCT was extended from 8 to 9 weeks; therefore studies performed before and after this time are designated in Table 1 to reflect the increased time Soldiers were at risk in the investigations subsequent to October 1998.

Table 1. Cumulative Incidence of Injury and Injury Incidence Rates During Army Training

	Length of Training (weeks)	Study (Reference Number)	Year Data Collected	Recruits (n)		Cumulative Injury Incidence (%)		Injury Incidence Rate (%/month)	
				Men	Women	Men	Women	Men	Women
Army Basic Combat Training	8 weeks	12[a]	1980	1,840	644	20.7	41.2	10.4	20.6
		11	1984	124	186	27.4	50.5	13.7	25.3
		18	1988	509	352	27.0	57.0	13.5	28.5
		16	1994	ND[b]	165	ND[b]	66.7	ND[b]	33.3
		19	1996	159	84	41.5	65.5	20.8	32.8
		13	1998	604	305	30.8	58.0	15.4	29.0
	9 weeks	20	1998	655	498	29.98	65.3	13.3	29.0
		6	2000	371	237	26.1	51.5	11.6	22.9
		21[c]	2000	682/441	579/554	13.5/16.9	36.1/46.8	6.0/7.5	16.0/20.8
		22[cd]	2003	442/569	295/377	19.5/27.9	41.0/47.7	8.7/12.4	18.2/21.2
		17	2007	2,147	915	36.9	64.7	16.4	28.8
Medic Advanced Individual Training	10 weeks	6	2000	439	287	24.0	30.0	9.6	12.0

Notes:
[a]Injury data from self-report questionnaire
[b]ND=No data collected on other gender
[c]Cohort study with two groups
[d]Injury data from surveillance system

(2) In addition to cumulative injury incidence and injury rates, injury risk factors have been identified. Injury risk factors identified during basic training included female

gender, low aerobic fitness, cigarette smoking prior to BCT, low physical activity prior to basic training, low muscular endurance, and training in the summer compared to training in the fall.[8–16, 23–27] A majority of the injuries occurring in Service members can be classified as either overuse or traumatic injury.[2]

b. Overuse Injuries. Overuse injuries are the result of abnormal and repetitive stress resulting in microtrauma to the soft tissues, bones or joints.[28] Some examples of overuse injuries include shin splints, tendonitis, stress fractures and bursitis.[29] In a study investigating injuries occurring in Army BCT and AIT, investigators found the largest proportion of injuries in both BCT and AIT were of the overuse type and involved the lower body.[6] In a study of Marine Corps basic training, investigators found that approximately 80 percent of injuries were the overuse type and involved the lower extremities (primarily the knee and ankle/foot regions).[3]

c. Traumatic Injuries. Traumatic injuries are a result of an outside agent or force that causes acute damage or harm to the structure or function of the body.[28] Some examples of traumatic injuries include contusions, fractures, joint dislocations, concussions, strains and sprains.[29] In athletes the majority of traumatic injuries relates to overstretching of the soft tissue.[30] When soft tissue is suddenly stretched beyond its yield point, it will tear or rupture. The muscles most prone to overstretching or tearing are those that cross two joints.[30] Risk factors associated with traumatic injuries include previous injury, tobacco use, and strength imbalances. In regard to previous injuries, an investigation found that basketball players with a history of ankle injuries were 5 times more likely to sustain another ankle injury.[31] For tobacco use, cigarette smokers have been shown to have higher scores on various measures of risk-taking behaviors possibly placing them at a higher risk of incurring a traumatic injury.[32] Muscle strength and balance abnormalities have also been investigated and associated with acute muscle injuries.[33,34]

6. METHODS.

a. Participants. Participants were Army personnel Service members attending AIT at APG (Edgewood Area) from January 2000 to June 2003. Soldiers attending AIT in the Edgewood Area of APG trained to qualify for one of five different military occupational specialties (MOSs) (Table 2). There were three companies (Alpha, Bravo, and Charlie) in the single training battalion at the Edgewood Area of APG (143rd Ordnance Battalion).

Table 2. Military Occupational Specialties at Aberdeen Proving Ground

Military Occupational Specialty	Weeks of Training
Track Vehicle Repairer (63H)	16
Wheeled Vehicle Repairer (63W)	13
Self Propelled Field Artillery System Mechanic (63D)	10
Fuel and Electrical System Repairer (63G)	9
Track Vehicle Mechanic (63Y)	12

b. Questionnaires. Upon arrival at APG, each Service member was asked to complete the Soldier health in-processing (SHIP) questionnaire (appendix B) as a part of the in-processing procedures. The questionnaire asked the Service members about their demographic and lifestyle characteristics. Information requested included rank, race, gender, date of birth, BCT site, whether or not the student currently had an injury or illness perceived to affect their AIT performance, and history of tobacco use.

c. Army Physical Fitness Test Scores. Army Physical Fitness Test (APFT) data were obtained from the 143rd Ordnance Battalion Training and Operations (S-3) office. The APFT consisted of three events: a 2-minute maximal effort push-up event, a 2-minute maximal effort sit-up event, and a 2-mile run performed for time. For the push-up, the subject lowered his or her body in a generally straight line to a point where his or her upper arm was parallel to the ground, and then returned to the starting point with elbows fully extended. For the sit-up, the subject's knees were bent at a 90° angle, fingers were interlocked behind the head, and a second person held the subject's ankles while the subject kept his or her heels firmly on the ground. The subject raised his upper body to a vertical position so that the base of the neck was anterior to the base of the spine and then returned to the starting position. Scores were the number of push-ups and sit-ups that were successfully completed within the separate 2-minute time periods. The performance measure for the run was the time taken to complete the 2-mile distance. Time between events was no less than 10 minutes.

d. Injury Data. Injuries were obtained from an injury surveillance system in the medical clinic serving the AIT Soldiers. Every time a Soldier reported to the medical clinic for an injury, a medical provider would fill out an injury sheet (appendix C). The medical provider could record the type of injury that occurred and the number of profile or quarter days given to the Soldier by checking the appropriate boxes on the injury sheet. Injuries from the data sheet were then classified into four categories: time-loss injuries, overuse time-loss injuries, lower extremity overuse time-loss injuries, and traumatic time-loss injuries. Time-loss injuries included an injury of any type (overuse, traumatic, other, unknown) plus a profile of 1 or more days. Overuse time-loss injuries were identified as such by the medical provider in item 4 (Injury Category) on the injury

sheet and included a profile of one or more days. Lower extremity overuse time-loss injuries were identified as overuse injuries on the injury sheet in item 4 (Injury Category) and included a profile of 1 or more days, but were limited to the injuries occurring to the leg (upper and lower), knee, ankle and foot. Traumatic time-loss injuries were identified as such on the injury sheet in item 4 (Injury Category) and included a profile of 1 or more days.

e. Data Analysis.

(1) The questions about tobacco use on the SHIP survey (appendix B) asked if the Service member had smoked one or more cigarettes within the 30 days prior to BCT and if he or she had smoked on 20 of the 30 days prior to BCT. If Soldiers answered "yes" to smoking one or more cigarettes within the last 30 days prior to BCT, but "no" to the question asking if they had smoked on 20 or more days in the 30 days prior to BCT, they were considered an "occasional smoker." If they answered yes to smoking on 20 of the last 30 days prior to BCT, they were considered a "frequent smoker." Those who answered "yes" to using smokeless tobacco at least once in the 30 days prior to BCT, but "no" to the question asking if they had used smokeless tobacco on 20 or more days in the 30 days prior to BCT, were considered "occasional smokeless tobacco users," and those who reported using smokeless tobacco on 20 or more days in the 30 days prior to BCT were considered "frequent smokeless tobacco users."

(2) The age of the Soldier was determined by his or her response to question 9 on the SHIP survey (appendix B). Age was then grouped into three categories: age 17–19 years, 20–24 years, and 25+ years.

(3) Cumulative time-loss injury incidence rates were calculated as follows:

(Soldiers with ≥1 time-loss injury)/(Total number of Soldiers in the Ordnance School) X 100%

(4) Person-time injury incidence rates for each injury category were calculated as follows:

(Soldiers with ≥1 time-loss injury)/(Total Soldier days in the Ordnance School X 10,000)

(5) The Statistical Package for the Social Sciences (SPSS), Version 16.0, was used for statistical analysis. Descriptive statistics (frequencies) were calculated for demographics (age, gender, race, military rank); BCT site; a current self-reported injury; a current self-reported illness; tobacco use variables; and push-ups, sit-ups, and the

2- mile run. Potential risk factors for time-loss injury, overuse time-loss injury, lower extremity overuse time-loss injury, and traumatic time-loss injury were explored using univariate and multivariate Cox regression. Hazard ratios and 95 percent confidence intervals (CIs) were calculated for each risk factor. Variables from the univariate analysis with a statistical significance of $p \leq 0.10$ were selected for a backward-stepping multivariate Cox regression. Since all of the tobacco variables were correlated (60 percent of smokeless users were also smokers), it was decided to only use the question, "How many cigarettes were smoked in the last 30 days before BCT," in the multivariate models. Multivariate hazard ratios (MHRs) and 95 percent CIs were calculated. For the Cox regression, APFT scores were converted to four quartiles (Qs) based on the distribution of scores where Q1 = high performance and Q4 = low performance.

7. RESULTS.

a. Descriptive Statistics.

(1) There were 3757 men and 498 women involved in the project. Table 3 displays the results from the SHIP questionnaire. A majority of the subjects were Caucasian men between the ages of 17 and 19 who had attended BCT at Fort Knox and were wheeled vehicle repairers (MOS 63W) of lower military rank (E1) and nonsmokers and non-smokeless tobacco users. The mean age (± standard deviation) for both men and women was 20 ± 3 years. Most of the women had attended BCT at Fort Jackson. A self-reported injury perceived to negatively affect AIT performance was reported by 7 percent of subjects, and a self-reported illness perceived to negatively affect AIT performance was reported by 2 percent of the subjects.

(2) When asked about smokeless tobacco use, men were 2.5 times more likely to be occasional smokeless tobacco users and 5.5 times more likely to be frequent smokeless tobacco users when compared to women. When asked if they had a current injury perceived to negatively affect AIT performance, women were 2.3 times more likely to answer yes when compared to men.

Table 3. Advanced Individual Training Ordnance School Soldier Health In-Processing Questionnaire Variables (Descriptive Statistics)

Variable	Level of Variables	Men n (%)	Women n (%)	Men and Women n (%)
Gender	Men Women Men and Women	3757 (100)	498 (100)	4255 (100)
Age	17–19 years 20–24 years 25+ years	2067 (55) 1324 (35) 366 (10)	242 (49) 17 1 (34) 85 (17)	2309 (54) 1495 (35) 451 (11)
Race	Caucasian Asian Black Hispanic Native	2452 (65) 103 (3) 480 (13) 506 (14) 216 (6)	330 (66) 9 (2) 87 (18) 44 (9) 28 (6)	2782 (65) 112 (3) 567 (13) 550 (13) 244 (6)
Rank	E1 E2 E3 E4+	2135 (57) 911 (24) 640 (17) 71 (2)	241 (48) 140 (28) 101 (20) 16 (3)	2376 (56) 1051 (25) 741 (17) 87 (2)
Basic Training Site	Fort Jackson Fort Knox Fort Leonard Wood Fort Benning Fort Sill	907 (24) 2135 (57) 189 (5) 357 (10) 169 (5)	401 (81) 0 (0) 69 (14) 0 (0) 28 (6)	1308 (31) 2135 (50) 258 (6) 357 (8) 197 (5)
Military Occupational Specialty	Track Vehicle Repairer (63H) Wheeled Vehicle Repairer (63W) Self-Propelled Field Artillery System Mechanic (63D) Fuel and Electrical System Repairer (63G) Track Vehicle Mechanic (63Y)	554 (15) 2168 (58) 214 (6) 286 (8) 535 (14)	59 (12) 352 (71) 0 (0) 28 (6) 59 (12)	613 (14) 2520 (59) 214 (5) 314 (7) 594 (14)
Self-Reported Injury	No Yes	3524 (94) 233 (6)	431 (87) 67 (14)	3955 (93) 300 (7)
Self-Reported Illness	No Yes Missing	3675 (98) 69 (2) 13 (0.3)	483 (97) 13 (3) 2 (0.4)	4158 (98) 82 (2) 15 (0.4)
Cigarette Use	Nonsmoker Occasional Frequent	2166 (58) 201 (5) 1390 (37)	296 (59) 34 (7) 168 (34)	2462 (58) 235 (6) 1558 (37)
How many cigarettes smoked per day?	Nonsmoker ≤ 10 10-20 ≥ 20 Missing	2166 (58) 367 (10) 582 (16) 408 (11) 234 (6)	296 (59) 65 (13) 58 (12) 40 (8) 39 (8)	2462 (58) 432 (10) 640 (15) 448 (11) 273 (6)
Smokeless Tobacco Use	Non-user Occasional smokeless Frequent smokeless	3158 (84) 171 (5) 428 (11)	481 (97) 8 (2) 9 (2)	3639 (86) 179 (4) 437 (10)
How much smokeless tobacco used per day?	Non-user ≤ 1 can 1 can or more ≥ 2 cans Missing	3158 (84) 262 (7) 122 (3) 27 (1) 188 (5)	481 (97) 6 (1) 2 (0.4) 0 (0) 9 (2)	3639 (86) 268 (6) 124 (3) 27 (1) 197 (5)

(3) Table 4 displays APFT scores for men and women. Compared to women, men performed an average of 22 more push-ups, an average of 2 more sit-ups, and ran the 2 miles 3.4 minutes faster.

Table 4. Army Physical Fitness Test Scores

Variable	Men n = 3757			Women n = 498		
	Mean ±SD	Min	Max	Mean ±SD	Min	Max
Push-Ups (Repetitions)	52±12	13	113	30±10	2	81
Sit-Ups (Repetitions)	62±10	22	109	60±12	26	122
2-Mile Run (Minutes)	14.9±1.5	10.9	32.9	18.3±2.0	13.6	30.6

(4) Table 5 displays person-time injury incidence rates for time-loss injury, overuse time-loss injury, lower extremity overuse time-loss injury, and traumatic time-loss injury for men and women. In all cases, injury rates are higher for men than women. Cumulative time-loss injury incidence was 31percent for men and 54 percent for women. When including both time-loss injuries and those not involving time loss, 36 percent of men and 61 percent of women experienced at least one injury during AIT.

Table 5. Person-Time Injury Incidence Rates for All Four Injury Outcomes (Injuries/10,000 Person-Days)

Injury Outcomes	Men Rate per 10,000 Person-Days	Women Rate per 10,000 Person-Days
Time-Loss Injuries	34.9	60.8
Overuse Time-Loss Injuries	23.8	46.8
Lower Extremity Overuse Time-Loss Injuries	20.7	44.1
Traumatic Time-Loss Injuries	8.9	11.7

b. Risk Factors for Time-Loss Injury.

(1) Table 6 displays the results of the univariate Cox regression with time-loss injury as the dependent variable. For men, time-loss injury risk was higher among those who were Native American (relative to Caucasian), of lower military rank (E1 relative to E2), who had attended BCT at Fort Jackson (relative to Fort Knox) and were smokers and/or smokeless tobacco users, with a self-reported injury, lower push-up

performance, lower sit-up performance, and slower two-mile run times. For women, time-loss injury risk was higher among those who were Caucasian (relative to Black), and frequent smokers and/or occasional smokeless tobacco users, with a self-reported injury, lower push-up performance, and slower 2-mile run times.

Table 6. Univariate Cox Regression: Risk Factors Associated with Time-Loss Injuries in Ordnance Advanced Individual Training

Variable	Men				Women			
	Variable Level	n (% TLI)[a]	Hazard Ratio (95% CI)[b]	p-value	Variable Level	n (%TLI)[a]	Hazard Ratio (95% CI)[b]	p-value
Age Group	17-19 years	2067 (30)	1.00		17-19 years	242 (54)	1.00	
	20-24 years	1324 (31)	1.05 (0.92-1.18)	0.48	20-24 years	171 (51)	0.89 (0.68-1.16)	0.39
	25+ years	366 (32)	1.10 (0.90-1.34)	0.37	25+ years	85 (61)	1.18 (0.86-1.63)	0.32
Race	Caucasian	2452 (32)	1.00		Caucasian	330 (57)	1.00	
	Asian	103 (25)	0.75 (0.51-1.1)	0.14	Asian	9 (44)	0.71 (0.26-1.91)	0.50
	Black	480 (33)	1.03 (0.87-1.22)	0.74	Black	87 (43)	0.69 (0.48-0.98)	0.04
	Hispanic	506 (24)	0.72 (0.59-0.87)	<0.01	Hispanic	44 (61)	1.18 (0.79-1.77)	0.42
	Native	216 (38)	1.26 (1.00-1.57)	0.05	Native	28 (54)	0.83 (0.49-1.41)	0.50
Rank	E1	2135 (32)	1.00		E1	241 (56)	1.00	
	E2	911 (28)	0.87 (0.75-1.00)	0.05	E2	140 (55)	1.02 (0.77-1.35)	0.88
	E3	640 (29)	0.92 (0.78-1.08)	0.31	E3	101 (48)	0.78 (0.56-1.09)	0.14
	E4+	71 (31)	0.92 (0.60-1.41)	0.69	E4+	16 (69)	1.36 (0.73-2.52)	0.33
Basic Training Site	Ft Jackson	907 (34)	1.00		Ft Jackson	401 (53)	1.00	
	Ft Knox	2135 (30)	0.86 (0.75-0.99)	0.03	Ft Knox	0		
	Ft Wood	189 (31)	0.90 (0.68-1.20)	0.48	Ft Wood	69 (59)	1.18 (0.85-1.65)	0.33
	Ft Benning	357 (31)	0.92 (0.74-1.14)	0.42	Ft Benning	0		
	Ft Sill	169 (27)	0.78 (0.57-1.06)	0.12	Ft Sill	28 (54)	1.03 (0.61-1.74)	0.91
Military Occupational Specialty	(63H)	554 (34)	1.00		(63H)	59 (63)	1.00	
	(63W)	2168 (30)	0.96 (0.81-1.13)	0.56	(63W)	352 (53)	0.98 (0.69-1.40)	0.91
	(63D)	214 (23)	0.97 (0.71-1.33)	0.85	(63D)	0	- -	
	(63G)	286 (28)	1.14 (0.88-1.49)	0.33	(63G)	28 (32)	0.65 (0.31-1.36)	0.25
	(63Y)	535 (35)	1.13 (0.92-1.38)	0.25	(63Y)	59 (64)	1.25 (0.79-1.96)	0.34
Self-Reported Illness	No	3675 (31)	1.00		No	483 (54)	1.00	
	Yes	69 (33)	1.11 (0.73-1.67)	0.64	Yes	13 (62)	1.14 (0.57-2.31)	0.71
Self-Reported Injury	No	3524 (30)	1.00		No	431 (52)	1.00	
	Yes	233 (51)	2.27 (1.88-2.75)	<0.01	Yes	67 (66)	1.67 (1.21-2.30)	<0.01
Cigarette Use 30 Days Before BCT	Nonsmokers	2166 (26)	1.00		Nonsmokers	296 (52)	1.00	
	Occasional	201 (31)	1.19 (0.92-1.55)	0.19	Occasional	34 (56)	1.08 (0.67-1.73)	0.77
	Frequent	1390 (38)	1.56 (1.38-1.75)	<0.01	Frequent	168 (58)	1.27 (0.98-1.63)	0.07
How Many Cigarettes (cig) in 30 Days Before BCT?	(Nonsmokers)	2166 (26)	1.00		(Nonsmokers)	296 (52)	1.00	
	10 cig or less	367 (34)	1.29 (1.06-1.57)	0.01	10 cig or less	65 (52)	1.03 (0.71-1.49)	0.89
	10-20 cig	582 (37)	1.50 (1.28-1.75)	<0.01	10-20 cig	58 (62)	1.37 (0.95-1.97)	0.09
	20 cig or more	408 (45)	1.97 (1.67-2.33)	<0.01	20 cig or more	40 (65)	1.71 (1.12-2.59)	0.01
Smokeless Tobacco Use 30 Days Before BCT	Nonuser	3158 (30)	1.00		Nonuser	481 (54)	1.00	
	Occasional	171 (34)	1.13 (0.86-1.47)	0.38	Occasional	8 (75)	2.18 (0.97-4.90)	0.06
	Frequent	428 (37)	1.31 (1.11-1.55)	<0.01	Frequent	9 (67)	1.51 (0.67-3.38)	0.32
How Many Cans of Smokeless Tobacco 30 Days Before BCT?	0 (Nonuser)	3158 (30)	1.00		0 (Nonuser)	481 (54)	1.00	
	Less than 1	262 (37)	1.31 (1.06-1.61)	0.01	Less than 1	6 (50)	1.00 (0.32-3.14)	0.99
	1 on average	122 (39)	1.42 (1.06-1.89)	0.02	1 on average	2 (100)	2.17 (0.54-8.74)	0.28
	2 or more	27 (44)	1.59 (0.90-2.81)	0.11	2 or more	0 (0)		

Table 6. Univariate Cox Regression: Risk Factors Associated with Time-Loss Injuries in Ordnance Advanced Individual Training (continued)

Variable	Men				Women			
	Variable Level	n (% TLI)[a]	Hazard Ratio (95% CI)[b]	p-value	Variable Level	n (%TLI)[a]	Hazard Ratio (95% CI)[b]	p-value
Push-Ups (Repetitions)	0-43	963 (38)	1.63 (1.38-1.93)	<0.01	0-23	132 (60)	1.47 (1.03-2.09)	0.03
	44-50	967 (32)	1.38 (1.16-1.64)	<0.01	24-30	149 (58)	1.44 (1.02-2.04)	0.04
	50-59	915 (29)	1.22 (1.02-1.46)	0.03	31-36	106 (49)	1.04 (0.71-1.53)	0.84
	60+	912 (24)	1.00		37+	111 (47)	1.00	
Sit-Ups (Repetitions)	0-55	962 (34)	1.47 (1.24-1.75)	<0.01	0-53	131 (60)	1.28 (0.91-1.76)	0.16
	56-61	930 (34)	1.51 (1.27-1.80)	<0.01	54-60	125 (54)	1.17 (0.83-1.66)	0.36
	62-68	972 (31)	1.34 (1.12-1.59)	<0.01	61-67	120 (52)	1.04 (0.73-1.48)	0.82
	69+	893 (24)	1.00		68+	122 (50)	1.00	
2-Mile Run (Minutes)	0-13.91	921 (26)	1.00		0-17.00	126 (42)	1.00	
	13.92-14.77	979 (27)	1.02 (0.86-1.22)	0.80	17.01-18.08	124 (56)	1.46 (1.02-2.08)	0.04
	14.78-15.62	936 (31)	1.23 (1.03-1.46)	0.02	18.09-19.38	122 (51)	1.27 (0.88-1.83)	0.21
	1 5.63+	921 (40)	1.64 (1.39-1.93)	<0.01	19.39+	126 (68)	2.04 (1.45-2.88)	<0.01

[a]TLI is time-loss injury. (Values are a percentage of the group that was injured.)
[b]CI is confidence interval.

(2) A backward-stepping multivariate analysis with time-loss injury as the dependent variable was performed with the following selected variables for men: race, rank, BCT site, self-reported injury, the number of cigarettes smoked in the 30 days before BCT, push-ups, sit-ups, and the 2-mile run. For men, rank, BCT, and push-ups did not reach the final step in the model. For women, the following variables were selected for inclusion in the multivariate model: race, self-reported injury, the number of cigarettes smoked in the 30 days before BCT, push-ups, and the 2-mile run. For women, the number of cigarettes smoked in the 30 days before BCT and push-ups did not reach the final step in the model.

(a) Table 7 displays the results of this analysis. For men, the risk of time-loss injury was independently associated with the Native American race (relative to Caucasians), self-reported injury, the number of cigarettes smoked in the 30 days before BCT, lower sit-up performance, and slower 2-mile run times. For women, a higher risk of time-loss injury was independently associated with the Caucasian race (relative to Blacks), self-reported injury, and slower 2-mile run times. Other multivariate models for men were also examined using the same variables above in the multivariate analysis.

(b) When a model was run limiting the fitness variables to just push-ups, push-ups made the final step and were found to place those who performed the least amount of push-ups at a higher risk of injury when compared to those who performed the most (MHR (Q4/Q1) = 1.4, 95 percent CI = 1.2-1.6). When another model was run substituting smokeless tobacco use for the number of cigarettes smoked per day, smokeless tobacco use made the final step, and frequent smokeless users were found

to have a higher risk of injury compared to non-smokeless users (MHR (frequent smokeless users/non-smokeless users) = 1.22, 95 percent CI = 1.03-1.45).

Table 7. Multivariate Cox Regression: Risk Factors Associated with Time-Loss Injuries in Ordnance Advanced Individual Training

Variable	Men (n=3523)				Women (n=459)			
	Variable Level	n	Hazard Ratio (95% CI)[a]	p-value	Variable Level	n	Hazard Ratio (95% CI)[a]	p-value
Race	Caucasian	2310	1.00		Caucasian	303	1.00	
	Asian	94	0.69 (0.45-1.06)	0.09	Asian	8	0.92 (0.34-2.48)	0.86
	Black	443	1.16 (0.96-1.39)	0.12	Black	81	0.65 (0.45-0.94)	0.02
	Hispanic	480	0.93 (0.76-1.14)	0.48	Hispanic	40	1.43 (0.93-2.19)	0.10
	Native	196	1.35 (1.06-1.71)	0.01	Native	27	0.77 (0.45-1.34)	0.36
Self-Reported Injury	No	3305	1.00		No	394	1.00	
	Yes	218	2.20 (1.80-2.67)	<0.01	Yes	65	1.60 (1.14-2.25)	<0.01
How Many Cigarettes 30 Days Before BCT	0 (Nonsmokers)	2166	1.00		b	b	b	b
	10 or less	367	1.25 (1.03-1.52)	0.03				
	10-20	582	1.46 (1.24-1.72)	<0.01				
	20 or more	408	1.87 (1.57-2.22	<0.01				
Sit-Ups (Repetitions)	0-55	911	1.23 (1.02-1.48)	0.03	b	b	b	b
	56-61	865	1.35 (1.12-1.62)	<0.01				
	62-68	910	1.21 (1.01-1.46)	0.04				
	69+	837	1.00					
2-Mile Run (Minutes)	0-13.91	860	1.00		0-17.00	116	1.00	
	13.92-14.77	919	0.96 (0.80-1.15)	0.64	17.01-18.08	116	1.58 (1.09-2.30)	0.02
	14.78-15.62	876	1.07 (0.90-1.29)	0.44	18.09-19.38	112	1.32 (0.90-1.96)	0.16
	15.63+	868	1.41 (1.18-1.69)	<0.01	19.39+	115	2.17 (1.50-3.14)	<0.01

[a]CI is confidence interval.
[b]Not entered into the model because it did not meet the p<0.10 criteria in the univariate analysis.

c. Risk Factors for Overuse Time-Loss Injury.

(1) Table 8 displays the results of the univariate Cox regression with overuse time-loss injuries as the dependent variable. For men, overuse time-loss injury risk was higher among those who were Caucasian (relative to Hispanic); in the MOS of 63G (fuel and electrical system repairer) or 63Y (track vehicle mechanic) (relative to 63H (track vehicle repairer)); had a self-reported injury, smoked and/or used smokeless tobacco; and had a lower performance on push-ups, sit-ups, or the 2-mile run. For women, overuse time-loss injury risk was higher among those who were between 17 to 19 years old (relative to 20- to 24-year-olds), Caucasian (relative to Black), of lower military rank (E3 relative to E1), and who had attended basic training at Fort Leonard Wood (relative to Fort Jackson), had a self-reported injury, used smokeless tobacco frequently (relative to non-users), and had slower 2-mile run times.

Table 8. Univariate Cox Regression: Risk Factors Associated with Overuse Time-Loss Injuries in Ordnance Advanced Individual Training

Variable	Men				Women			
	Variable Level	n (% OI)[a]	Hazard Ratio (95% CI)[b]	p-value	Variable Level	n (% OI)[a]	Hazard Ratio (95% CI)[b]	p-value
Age Group	17-19 years	2067 (21)	1.00		17-19 years	242 (44)	1.00	
	20-24 years	1324 (21)	0.98 (0.84-1.14)	0.79	20-24 years	171 (36)	0.75 (0.55-1.03)	0.08
	25+ years	366 (20)	0.97 (0.75-1.24)	0.79	25+ years	85 (48)	1.11 (0.78-1.60)	0.56
Race	Caucasian	2452 (22)	1.00		Caucasian	330 (43)	1.00	
	Asian	103 (18)	0.76 (0.48-1.22)	0.26	Asian	9 (44)	1.01 (0.37-2.73)	0.99
	Black	480 (21)	0.92 (0.74-1.13)	0.42	Black	87 (32)	0.70 (0.47-1.05)	0.08
	Hispanic	506 (16)	0.69 (0.54-0.87)	<0.3	Hispanic	44 (48)	1.23 (0.78-1.95)	0.37
	Native	216 (25)	1.15 (0.86-1.52)		Native	28 (46)	1.03 (0.58-1.82)	0.92
Rank	E1	2135 (22)	1.00		E1	241 (43)	1.00	
	E2	911 (19)	0.87 (0.73-1.03)	0.11	E2	140 (44)	1.02 (0.74-1.40)	0.90
	E3	640 (20)	0.91 (0.75-1.10)	0.33	E3	101 (35)	0.71 (0.49-1.05)	0.08
	E4+	71 (20)	0.86 (0.50-1.46)	0.57	E4+	16 (56)	1.42 (0.72-2.81)	0.31
Basic Training Site	Ft Jackson	907 (21)	1.00		Ft Jackson	401 (40)	1.00	
	Ft Knox	2135 (21)	0.99 (0.84-1.18)	0.93	Ft Knox	0		
	Ft Wood	189 (18)	0.83 (0.58-1.20)	0.33	Ft Wood	69 (51)	1.40 (0.97-2.01)	0.08
	Ft Benning	357 (22)	1.05 (0.81-1.37)	0.71	Ft Benning	0		
	Ft Sill	169 (20)	0.93 (0.65-1.34)	0.71	Ft Sill	28 (43)	1.11 (0.62-2.00)	0.72
Military Occupational Specialty	(63H)	554 (22)	1.00		63H	59 (44)	1.00	
	(63W)	2168 (21)	1.10 (0.90-1.35)	0.35	63W	352 (42)	1.13 (0.74-1.72)	0.57
	(63D)	214 (16)	1.10 (0.75-1.61)	0.64	63D	0	- -	
	(63G)	286 (19)	1.33 (0.96-1.83)	0.09	63G	28 (29)	0.86 (0.39-1.90)	0.70
	(63Y)	535 (25)	1.33 (1.04-1.70)	0.03	63Y	59 (46)	1.17 (0.68-2.01)	0.57
Self-Reported Illness	No	3675 (21)	1.00		No	483 (42)	1.00	
	Yes	69 (26)	1.26 (0.79-2.00)	0.34	Yes	13 (46)	1.19 (0.53-2.69)	0.67
Self-Reported Injury	No	3524 (20)	1.00		No	431 (40)	1.00	
	Yes	233 (37)	2.30 (1.84-2.87)	<0.01	Yes	67 (52)	1.56 (1.09-2.25)	0.02
Cigarette Use 30 Days Before BCT	Nonsmokers	2166 (17)	1.00		Nonsmokers	296 (40)	1.00	
	Occasional	201 (20)	1.16 (0.84-1.60)	0.38	Occasional	34 (38)	0.92 (0.52-1.63)	0.77
	Frequent	1390 (27)	1.67 (1.45-1.93)	<0.01	Frequent	168 (45)	1.22 (0.91-1.62)	0.18
How Many Cigarettes (cig) in 30 Days Before BCT?	Nonsmokers	2166 (17)	1.00		Nonsmokers	296 (40)	1.00	
	10 cig or less	367 (20)	1.17 (0.92-1.51)	0.21	10 cig or less	65 (43)	1.10 (0.73-1.65)	0.66
	10-20 cig	582 (28)	1.75 (1.46-2.10)	<0.01	10-20 cig	58 (48)	1.35 (0.89-2.04)	0.15
	20 cig or more	408 (32)	2.07 (1.70-2.52)	<0.01	20 cig or more	40 (50)	1.47 (0.92-2.37)	0.11
Smokeless Tobacco Use 30 Days Before BCT	Nonuser	3158 (20)	1.00		Nonuser	481 (41)	1.00	
	Occasional	171 (24)	1.17 (0.85-1.60)	0.35	Occasional	8 (63)	1.93 (0.79-4.68)	0.15
	Frequent	428 (28)	1.48 (1.21-1.79)	<0.01	Frequent	9 (67)	2.07 (0.92-4.68)	0.08
How Many Cans of Smokeless Tobacco 30 Days Before BCT?	Nonuser	3158 (20)	1.00		Nonuser	481 (41)	1.00	
	Less than 1	262 (29)	1.55 (1.22-1.97)	<0.01	Less than 1	6 (50)	1.40 (0.45-4.38)	0.56
	1 on average	122 (27)	1.41 (0.99-2.00)	0.06	1 on average	2 (100)	2.90 (0.72-	0.14
	2 or more	27 (33)	1.76 (0.91-3.40)	0.09	2 or more	0 (0)	11.68)	
Push-Ups (Repetitions)	0-43	963 (27)	1.82 (1.48-2.23)	<0.01	0-23	132 (43)	1.23 (0.82-1.85)	0.31
	44-50	967 (23)	1.50 (1.22-1.85)	<0.01	24-30	149 (44)	1.30 (0.88-1.92)	0.20
	50-59	915 (18)	1.17 (0.93-1.46)	0.17	31-36	106 (43)	1.15 (0.75-1.76)	0.52
	60+	912 (16)	1.00		37+	111 (36)	1.00	

Table 8. Univariate Cox Regression: Risk Factors Associated with Overuse Time-Loss Injuries in Ordnance Advanced Individual Training (continued)

Variable	Men				Women			
	Variable Level	n (% OI)[a]	Hazard Ratio (95% CI)[b]	p-value	Variable Level	n (% OI)[a]	Hazard Ratio (95% CI)[b]	p-value
Sit-Ups (Repetitions)	0-55	962 (25)	1.67 (1.35-2.06)	<0.01	0-53	131 (47)	1.29 (0.88-1.90)	0.19
	56-61	930 (23)	1.58 (1.28-1.96)	<0.01	54-60	125 (44)	1.28 (0.89-1.90)	0.21
	62-68	972 (20)	1.35 (1.09-1.68)	<0.01	61-67	120 (38)	1.03 (0.69-1.56)	0.88
	69+	893 (16)	1.00		68+	122 (38)	1.00	
2-Mile Run (Minutes)	0-13.91	921 (17)	1.00		0-17.00	126 (33)	1.00	
	13.92-14.77	979 (19)	1.10 (0.88-1.36)	0.40	17.01-18.08	124 (39)	1.21 (0.80-1.83)	0.37
	14.78-15.62	936 (21)	1.29 (1.05-1.59)	0.02	18.09-19.38	122 (42)	1.30 (0.86-1.96)	0.21
	1 5.63+	921 (28)	1.73 (1.42-2.11)	<0.01	19.39+	126 (53)	1.87 (1.27-2.75)	<0.01

[a]OI is overuse injury. (Values are a percentage of the group that was injured.)
[b]CI is confidence interval.

(2) A backward-stepping multivariate analysis with overuse time-loss injury as the dependent variable was performed with the following selected variables for men: race, MOS, self-reported injury, the number of cigarettes smoked in the 30 days before BCT, push-ups, sit-ups, and the 2-mile run. For men, race and push-ups did not reach the final step in the model. For women, the following variables were selected for inclusion in the multivariate model: age, race, rank, basic training site, self-reported injury, and the 2-mile run. For women, rank did not reach the final step in the model.

(a) Table 9 displays the results of this analysis. For men, a higher risk of overuse time-loss injury was independently associated with MOS (63G (fuel and electrical system repairer) and 63Y (track vehicle mechanic) relative to MOS 63H (track vehicle repairer)); self-reported injury; the number of cigarettes smoked in the 30 days before BCT; lower sit-up performance; and slower 2-mile run times. For women, a higher risk of overuse time-loss injury was independently associated with 17- to 19-year-olds (relative to 20- to 24-year-olds), the Caucasian race (relative to Blacks), basic training attendance at Fort Leonard Wood (relative to Fort Jackson), a self-reported injury, and slower 2-mile run times. Other multivariate models for men were also examined using the same variables above in the multivariate analysis.

(b) When a model was run limiting the fitness variables to just push-ups, push-ups made the final step and were found to place those who performed the least amount of push-ups at a higher risk of injury when compared to those who performed the most (MHR (Q4/Q1) = 1.6, 95 percent CI = 1.3-1.9). When another model was run substituting smokeless tobacco use for the number of cigarettes smoked per day, smokeless tobacco use made the final step, and frequent smokeless users were found to have a higher risk of injury compared to non-smokeless users (MHR (frequent smokeless users/non-smokeless users) = 1.41, 95 percent CI = 1.16-1.71).

Table 9. Multivariate Cox Regression: Risk Factors Associated with Overuse Time-Loss Injuries in Ordnance Advanced Individual Training

Variable	Men (n=3523)				Women (n=498)			
	Variable Level	n	Hazard Ratio (95% CI)[a]	p-value	Variable Level	n	Hazard Ratio (95% CI)[a]	p-value
Age Group	b	b	b	b	17-19 20-24 25+	242 171 85	1.00 0.73 (0.53-1.00) 1.19 (0.81-1.74)	 0.05 0.39
Race	b	b	b	b	Caucasian Asian Black Hispanic Native	330 9 87 44 28	1.00 1.17 (0.43-3.19) 0.61 (0.40-0.92) 1.38 (0.86-2.20) 0.95 (0.53-1.70)	 0.76 0.02 0.18 0.86
Basic Training Site	b	b	b	b	Ft Jackson Ft Knox Ft Leonard Ft Benning Ft Sill	401 0 69 0 28	1.00 1.58 (1.08-2.31) 1.19 (0.66-2.15)	 0.02 0.57
Military Occupational Specialty	63H 63W 63D 63G 63Y	518 2033 204 264 504	1.00 1.17 (0.95-1.45) 1.13 (0.76-1.67) 1.50 (1.07-2.10) 1.35 (1.05-1.75)	 0.15 0.54 0.02 0.02	b	b	b	b
Self-Reported Injury	No Yes	3305 218	1.00 2.23 (1.76-2.81)	 <0.01	No Yes	431 67	1.00 1.47 (1.02-2.13)	 0.04
How Many Cigarettes 30 Days Before BCT	Nonsmokers 10 or less 10-20 20 or more	2166 367 582 408	1.00 1.12 (0.87-1.44) 1.68 (1.39-2.02) 1.93 (1.58-2.36)	 0.38 <0.01 <0.01	b	b	b	b
Sit-Ups (Repetitions)	0-55 56-61 62-68 69+	911 865 910 837	1.38 (1.10-1.73) 1.42 (1.13-1.78) 1.24 (0.99-1.56) 1.00	<0.01 <0.01 0.06	b	b	b	b
2-Mile Run (Minutes)	0-13.91 13.92-14.77 14.78-15.62 15.63+	860 919 876 868	1.00 1.00 (0.80-1.26) 1.14 (0.92-1.43) 1.46 (1.18-1.81)	 0.97 0.24 <0.01	0-17.00 17.01-18.08 18.09-19.38 19.39+	126 124 122 126	1.00 1.22 (0.81-1.86) 1.41 (0.93-2.13) 1.95 (1.31-2.90)	 0.34 0.11 <0.01

[a]CI is confidence interval.
[b]Not entered into the model because it did not meet the p<0.10 criteria in the univariate analysis.

d. Risk Factors for Lower Extremity Overuse Time-Loss Injury.

(1) Table 10 displays the results of the univariate Cox regression with lower extremity overuse time-loss injuries as the dependent variable. For men, lower extremity overuse time-loss injury risk was higher for those who were Caucasian (relative to Hispanic), in the MOS of 63Y (track vehicle mechanic) (relative to 63H (track vehicle repairer)), had a self-reported injury, smoked and/or used smokeless tobacco, and had a lower performance on push-ups, sit-ups, and slower 2-mile run times. For women, lower extremity overuse time-loss injury risk was higher for those who were of lower rank (E1 relative to E3), who had attended basic training at Fort Leonard Wood

(relative to attendance at Fort Jackson), had a self-reported injury, and had lower performance on push-ups and slower 2-mile run times.

Table 10. Univariate Cox Regression: Risk Factors Associated with Lower Extremity Overuse Time-Loss Injuries in Ordnance Advanced Individual Training

Variable	Men				Women			
	Variable Level	n (% LOI)[a]	Hazard Ratio (95% CI)[b]	p-value	Variable Level	n (% LOI)[a]	Hazard Ratio (95% CI)[b]	p-value
Age Group	17-19	2067 (18)	1.00		17-19	242 (41)	1.00	
	20-24	1324 (18)	1.01 (0.86-1.19)	0.91	20-24	171 (34)	0.80 (0.58-1.11)	0.18
	25+	366 (19)	1.06 (0.82-1.38)	0.64	25+	85 (47)	1.21 (0.83-1.74)	0.32
Race	Caucasian	2452 (19)	1.00		Caucasian	330 (40)	1.00	
	Asian	103 (17)	0.84 (0.52-1.36)	0.47	Asian	9 (44)	1.11 (0.41-3.00)	0.84
	Black	480 (17)	0.85 (0.67-1.07)	0.17	Black	87 (32)	0.77 (0.51-1.16)	0.21
	Hispanic	506 (14)	0.69 (0.54-0.89)	<0.01	Hispanic	44 (48)	1.36 (0.86-2.15)	0.19
	Native	216 (23)	1.22 (0.91-1.64)	0.18	Native	28 (39)	0.95 (0.51-1.76)	0.87
Rank	E1	2135 (19)	1.00		E1	241 (42)	1.00	
	E2	911 (17)	0.86 (0.72-1.04)	0.12	E2	140 (41)	0.94 (0.68-1.31)	0.73
	E3	640 (16)	0.86 (0.69-1.06)	0.15	E3	101 (30)	0.63 (0.42-0.95)	0.03
	E4+	71 (18)	0.92 (0.53-1.60)	0.76	E4+	16 (56)	1.46 (0.74-2.88)	0.28
Basic Training Site	Ft Jackson	907 (19)	1.00		Ft Jackson	401 (37)	1.00	
	Ft Knox	2135 (19)	0.99 (0.82-1.18)	0.88	Ft Knox	0 (0)		
	Ft Wood	189 (14)	0.73 (0.48-1.10)	0.13	Ft Wood	69 (51)	1.56 (1.08-2.25)	0.02
	Ft Benning	357 (18)	0.99 (0.75-1.32)	0.96	Ft Benning	0 (0)		
	Ft Sill	169 (18)	0.98 (0.67-1.43)	0.91	Ft Sill	28 (43)	1.22 (0.68-2.20)	0.50
Military Occupational Specialty	63H	554 (19)	1.00		63H	59 (44)	1.00	
	63W	2168 (18)	1.10 (0.88-1.37)	0.41	63W	352 (39)	1.02 (0.67-1.55)	0.94
	63D	214 (15)	1.16 (0.78-1.73)	0.47	63D	0 (0)		
	63G	286 (14)	1.07 (0.74-1.54)	0.71	63G	28 (29)	0.82 (0.37-1.81)	0.62
	63Y	535 (21)	1.26 (0.97-1.65)	0.09	63Y	59 (42)	1.04 (0.60-1.81)	0.89
Self-Reported Illness	No	3675 (18)	1.00		No	483 (39)	1.00	
	Yes	69 (22)	1.18 (0.71-1.97)	0.53	Yes	13 (46)	1.28 (0.57-2.88)	0.56
Self-Reported Injury	No	3524 (18)	1.00		No	431 (38)	1.00	
	Yes	233 (30)	2.06 (1.61-2.63)	<0.01	Yes	67 (49)	1.54 (1.06-2.24)	0.02
Cigarette Use 30 Days Before BCT	Nonsmokers	2166 (15)	1.00		Nonsmokers	296 (39)	1.00	
	Occasional	201 (18)	1.25 (0.89-1.76)	0.20	Occasional	34 (32)	0.83 (0.45-1.54)	0.55
	Frequent	1390 (24)	1.75 (1.50-2.04)	<0.01	Frequent	168 (42)	1.20 (0.89-1.62)	0.23
How Many Cigarettes (cig) in 30 Days Before BCT?	Nonsmokers	2166 (15)	1.00		Nonsmokers	296 (39)	1.00	
	10 cig or less	367 (17)	1.22 (0.93-1.60)	0.15	10 cig or less	65 (42)	1.13 (0.75-1.73)	0.56
	10-20 cig	582 (25)	1.78 (1.46-2.17)	<0.01	10-20 cig	58 (43)	1.26 (0.82-1.95)	0.30
	20 cig or more	408 (30)	2.24 (1.82-2.77)	<0.01	20 cig or more	40 (48)	1.46 (0.89-2.37)	0.13
Smokeless Tobacco Use 30 Days Before BCT	Non-user	3158 (17)	1.00		Non-user	481 (39)	1.00	
	Occasional	171 (22)	1.24 (0.88-1.73)	0.22	Occasional	8 (63)	2.03 (0.83-4.93)	0.12
	Frequent	428 (26)	1.57 (1.28-1.93)	<0.01	Frequent	9 (44)	1.29 (0.48-3.49)	0.61
How Many Cans of Smokeless Tobacco 30 Days Before BCT?	Non-use)	3158 (17)	1.00		Non-user	481 (39)	1.00	
	Less than 1	262 (26)	1.61 (1.25-2.07)	<0.01	Less than 1	6 (33)	0.89 (0.22-3.57)	0.87
	1 on average	122 (25)	1.55 (1.08-2.23)	0.02	1 on average	2 (50)	1.28 (0.18-9.11)	0.81
	2 or more	27 (30)	1.84 (0.91-3.69)	0.09	2 or more	0		
Push-Ups (Repetitions)	0-43	963 (23)	1.70 (1.36-2.12)	<0.01	0-23	132 (42)	1.38 (0.90-2.13)	0.14
	44-50	967 (20)	1.49 (1.19-1.86)	<0.01	24-30	149 (43)	1.50 (0.99-2.27)	0.06
	50-59	915 (16)	1.20 (0.94-1.52)	0.14	31-36	106 (41)	1.32 (0.84-2.07)	0.22
	60+	912 (14)	1.00		37+	111 (31)	1.00	

Table10. Univariate Cox Regression: Risk Factors Associated with Lower Extremity Overuse Time-Loss Injuries in Ordnance Advanced Individual Training (continued)

Variable	Men				Women			
	Variable Level	n (% LOI)[a]	Hazard Ratio (95% CI)[b]	p-value	Variable Level	n (% LOI)[a]	Hazard Ratio (95% CI)[b]	p-value
Sit-Ups (Repetitions)	0-55	962 (22)	1.78 (1.41-2.23)	<0.01	0-53	131 (44)	1.37 (0.91-2.04)	0.13
	56-61	930 (20)	1.63 (1.29-2.06)	<0.01	54-60	125 (43)	1.39 (0.93-2.09)	0.11
	62-68	972 (18)	1.47 (1.16-1.86)	<0.01	61-67	120 (36)	1.09 (0.71-1.67)	0.70
	69+	893 (13)	1.00		68+	122 (34)	1.00	
2-Mile Run (Minutes)	0-13.91	921 (14)	1.00		0-17.00	126 (32)	1.00	
	13.92-14.77	979 (16)	1.11 (0.87-1.40)	0.40	17.01-18.08	124 (38)	1.23 (0.80-1.87)	0.35
	14.78-15.62	936 (18)	1.28 (1.02-1.61)	0.03	18.09-19.38	122 (38)	1.23 (0.80-1.87)	0.35
	15.63+	921 (25)	1.83 (1.47-2.26)	<0.01	19.39+	126 (50)	1.77 (1.19-2.64)	<0.01

[a]LOI is lower extremity overuse injury. (Values are a percentage of the group that was injured.)
[b]CI is confidence interval.

(2) A backward-stepping multivariate analysis with lower extremity overuse time-loss injury as the dependent variable was performed with the following selected variables for men: race, MOS, self-reported injury, the number of cigarettes smoked in the 30 days before BCT, push-ups, sit-ups, and 2-mile run times. For men, race, MOS, and push-ups did not reach the final step in the model. For women, the following variables were selected for inclusion in the multivariate model: rank, basic training site, self-reported injury, push-ups, and 2-mile run times. For women, rank and push-ups did not reach the final step in the model. Table 11 displays the results of this analysis. For men, a higher risk of lower extremity overuse time-loss injury was independently associated with self-reported injury, the number of cigarettes smoked in the 30 days before BCT, lower sit-up performance, and slower 2-mile run times. For women, a higher risk of lower extremity overuse time-loss injury was independently associated with those who had attended basic training at Fort Leonard Wood (relative to Fort Jackson), had a self-reported injury, and slower 2-mile run times.

Table 11. Multivariate Cox Regression: Risk Factors Associated with Lower Extremity Overuse Time-Loss Injuries in Ordnance Advanced Individual Training

Variable	Men (n=3523)				Women (n=498)			
	Category of Variable	n	Hazard Ratio (95% CI)[a]	p-value	Category of Variable	n	Hazard Ratio (95% CI)[a]	p-value
Basic Training Site	b	b	b	b	Ft Jackson	401	1.00	
					Ft Knox	0		
					Ft Leonard	69	1.67 (1.14-2.43)	<0.01
					Ft Benning	0		
					Ft Sill	28	1.22 (0.68-2.21)	0.51
Self-Reported Injury	No	3305	1.00		No	431	1.00	
	Yes	218	1.95 (1.51-2.52)	<0.01	Yes	67	1.39 (0.95-2.03)	0.09
How Many Cigarettes 30 Days Before BCT	Nonsmokers	2166	1.00		b	b	b	b
	10 or less	367	1.17 (0.89-1.53)	0.25				
	10-20	582	1.69 (1.38-2.06)	<0.01				
	20 or more	408	2.08 (1.68-2.57)	<0.01				

Table 11. Multivariate Cox Regression: Risk Factors Associated with Lower Extremity Overuse Time-Loss Injuries in Ordnance Advanced Individual Training (continued)

Variable	Men (n=3523)				Women (n=498)			
	Category of Variable	n	Hazard Ratio (95% CI)[a]	p-value	Category of Variable	n	Hazard Ratio (95% CI)[a]	p-value
Sit-Ups (Repetitions)	0-55 56-61 62-68 69+	911 865 910 837	1.45 (1.13-1.85) 1.42 (1.11-1.82) 1.33 (1.04-1.70) 1.00	<0.01 <0.01 0.02	b	b	b	b
2-Mile Run (Minutes)	0-13.91 13.92-14.77 14.78-15.62 15.63+	860 919 876 868	1.00 0.98 (0.77-1.25) 1.09 (0.86-1.39) 1.49 (1.18-1.87)	 0.87 0.48 <0.01	0-17.00 17.01-18.08 18.09-19.38 19.39+	126 124 122 126	1.00 1.18 (0.77-1.80) 1.23 (0.81-1.89) 1.80 (1.20-2.69)	 0.45 0.34 <0.01

[a]CI is confidence interval.
[b]Not entered into the model because it did not meet the p<0.10 criteria in the univariate analysis.

e. Rick Factors for Traumatic Time-Loss Injury.

(1) Table 12 displays the results of the univariate Cox regression with traumatic time-loss injury as the dependent variable. For men, traumatic time-loss injury was higher among those who were Native American (relative to Caucasian), attended BCT at Ft Leonard Wood (compared to Ft Jackson), had a self-reported injury, smoked, used ≥2 cans of smokeless tobacco in the 30 days prior to BCT, and had a lower performance on sit-ups. For women, traumatic time-loss injury risk was higher among those who were Black (relative to Caucasian), had a self-reported injury, and smoked.

Table 12. Univariate Cox Regression: Risk Factors Associated with Traumatic Time-Loss Injuries in Ordnance Advanced Individual Training

Variable	Men				Women			
	Category of Variable	n (% TI)[a]	Hazard Ratio (95% CI)[b]	p-value	Category of Variable	n (% TI)[a]	Hazard Ratio (95% CI)[b]	p-value
Age Group	17-19 20-24 25+	2067 (8) 1324 (8) 366 (7)	1.00 0.97 (0.76-1.24) 0.81 (0.53-1.24)	 0.82 0.34	17-19 20-24 25+	242 (10) 171 (12) 85 (9)	1.00 1.39 (0.76-2.52) 1.03 (0.46-2.31)	 0.29 0.95
Race	Caucasian Asian Black Hispanic Native	2452 (8) 103 (7) 480 (9) 506 (6) 216 (12)	1.00 0.90 (0.42-1.91) 1.26 (0.91-1.74) 0.80 (0.54-1.16) 1.55 (1.02-2.36)	 0.78 0.17 0.24 0.04	Caucasian Asian Black Hispanic Native	330 (13) 9 (0) 87 (5) 44 (5) 28 (7)	1.00 c 0.35 (0.12-0.97) 0.35 (0.08-1.43) 0.50 (0.12-2.07)	 0.04 0.14 0.34
Rank	E1 E2 E3 E4+	2135 (8) 911 (9) 640 (7) 71 (4)	1.00 1.12 (0.86-1.46) 0.97 (0.70-1.34) 0.45 (0.14-1.44)	 0.42 0.84 0.18	E1 E2 E3 E4+	241 (12) 140 (10) 101 (8) 16 (6)	1.00 0.83 (0.47-1.68) 0.68 (0.31-1.49) 0.56 (0.08-4.15)	 0.71 0.34 0.57
Basic Training Site	Ft Jackson Ft Knox Ft Leonard Ft Benning Ft Sill	907 (7) 2135 (8) 189 (11) 357 (9) 169 (5)	1.00 1.14 (0.86-1.52) 1.57 (0.95-2.59) 1.28 (0.83-1.97) 0.79 (0.39-1.58)	 0.37 0.08 0.26 0.50	Ft Jackson Ft Knox Ft Leonard Ft Benning Ft Sill	401 (11) 0 (0) 69 (7) 0 (0) 28 (18)	1.00 - - 0.65 (0.26-1.64) - - 1.93 (0.76-4.90)	 0.36 0.17

Table 12. Univariate Cox Regression: Risk Factors Associated with Traumatic Time-Loss Injuries in Ordnance Advanced Individual Training (continued)

Variable	Men				Women			
	Category of Variable	n (% TI)[a]	Hazard Ratio (95% CI)[b]	p-value	Category of Variable	n (% TI)[a]	Hazard Ratio (95% CI)[b]	p-value
Military Occupational Specialty	63H	554 (9)	1.00		63H	59 (15)	1.00	
	63W	2168 (8)	1.10 (0.79-1.52)	0.58	63W	352 (11)	0.96 (0.45-2.08)	0.92
	63D	214 (7)	1.30 (0.72-2.34)	0.38	63D	0 (0)	- -	
	63G	286 (4)	0.73 (0.38-1.38)	0.33	63G	28 (4)	0.49 (0.06-3.89)	0.48
	63Y	535 (8)	0.97 (0.63-1.47)	0.87	63Y	59 (9)	0.74 (0.24-2.25)	0.74
Self-Reported Illness	No	3675 (8)	1.00		No	483 (10)	1.00	
	Yes	69 (7)	0.89 (0.37-2.15)	0.79	Yes	13 (15)	1.58 (0.38-6.49)	0.53
Self-Reported Injury	No	3524 (8)	1.00		No	431 (9)	1.00	
	Yes	233 (12)	1.59 (1.07-2.36)	0.02	Yes	67 (18)	2.19 (1.14-4.20)	0.02
Cigarette Use 30 Days Before BCT	Nonsmokers	2166 (7)	1.00		Nonsmokers	296 (10)	1.00	
	Occasional	201 (9)	1.32 (0.81-2.15)	0.27	Occasional	34 (6)	0.61 (0.15-2.59)	0.51
	Frequent	1390 (10)	1.44 (1.14-1.83)	<0.01	Frequent	168 (13)	1.38 (0.79-2.43)	0.26
How Many Cigarettes (cig) in 30 Days Before BCT?	Nonsmokers	2166 (7)	1.00		Nonsmokers	296 (10)	1.00	
	10 cig or less	367 (10)	1.48 (1.03-2.13)	0.04	10 or less	65 (3)	0.32 (0.08-1.35)	0.12
	10-20 cig	582 (9)	1.33 (0.97-1.83)	0.08	10-20	58 (17)	1.90 (0.92-3.91)	0.08
	20 cig or more	408 (11)	1.65 (1.18-2.31)	<0.01	20 or more	40 (20)	2.42 (1.10-5.33)	0.03
Smokeless Tobacco Use 30 Days Before BCT	Nonuser	3158 (8)	1.00		Nonuser	481 (10)	1.00	
	Occasional	171 (9)	1.05 (0.62-1.78)	0.86	Occasional	8 (25)	3.02 (0.73-12.45)	0.19
	Frequent	428 (9)	1.21 (0.87-1.70)	0.26	Frequent	9 (0)	[c]	
How Many Cans of Smokeless Tobacco 30 Days Before BCT?	Nonuser	3158 (8)	1.00		Nonuser	481 (10)		
	Less than 1	262 (8)	1.06 (0.68-1.66)	0.79	Less than 1	6 (0)	[c]	
	1 on average	122 (10)	1.30 (0.73-2.33)	0.37	1 on average	2 (0)	[c]	
	2 or more	27 (22)	3.24 (1.44-7.29)	<0.01	2 or more	0		
Push-Ups (Repetitions)	0-43	963 (8)	1.04 (0.76-1.43)	0.81	0-23	132 (14)	1.54 (0.72-3.31)	0.27
	44-50	967 (8)	0.98 (0.71-1.36)	0.93	24-30	149 (11)	1.22 (0.56-2.66)	0.62
	50-59	915 (7)	0.92 (0.66-1.29)	0.63	31-36	106 (5)	0.49 (0.17-1.44)	0.20
	60+	912 (8)	1.00		37+	111 (10)	1.00	
Sit-Ups (Repetitions)	0-55	962 (9)	1.29 (0.92-1.81)	0.14	0-53	131 (14)	1.76 (0.79-3.96)	0.17
	56-61	930 (9)	1.40 (1.00-1.96)	0.05	54-60	125 (11)	1.54 (0.67-3.56)	0.31
	62-68	972 (7)	1.13 (0.80-1.60)	0.50	61-67	120 (9)	1.28 (0.53-3.10)	0.58
	69+	893 (7)	1.00		68+	122 (7)	1.00	
2-Mile Run (Minutes)	0-13.91	921 (7)	1.00		0-17.00	126 (7)	1.00	
	13.92-14.77	979 (6)	0.87 (0.62-1.23)	0.43	17.01-18.08	124 (11)	1.53 (0.66-3.54)	0.32
	14.78-15.62	936 (8)	1.12 (0.80-1.55)	0.51	18.09-19.38	122 (10)	1.31 (0.55-3.12)	0.54
	15.63+	921 (10)	1.30 (0.93-1.76)	0.13	19.39+	126 (14)	1.70 (0.75-3.86)	0.21

[a]TI is traumatic injury. (Values are a percentage of the group that was injured.)
[b]CI is confidence interval.
[c]Women had no reported traumatic injuries.

(2) A backward-stepping multivariate analysis with traumatic time-loss injury as the dependent variable was performed with the following selected variables for men: race, basic training site, self-reported injury, the number of cigarettes smoked in the 30 days before BCT, and sit-ups. For men, the BCT site and sit-ups did not reach the final step in the model. For women, the following variables were selected for inclusion in the multivariate model: race and self-reported injury. For women, race did not reach the

final step in the model. Table 13 displays the results of this analysis. For men, a higher risk of traumatic time-loss injury was independently associated with Black and Native American race (relative to Caucasian), a self-reported injury, and smoking. For women, a higher risk of traumatic time-loss injury was independently associated with a self-reported injury.

Table 13. Multivariate Cox Regression: Risk Factors Associated with Traumatic Time-Loss Injuries in Ordnance Advanced Individual Training

Variable	Men (n=3523)				Women (n=498)			
	Category of Variable	n	Hazard Ratio (95% CI)[a]	p-value	Category of Variable	n	Hazard Ratio (95% CI)[a]	p-value
Race	Caucasian	2310	1.00					
	Asian	94	0.91 (0.40-2.06)	0.82				
	Black	443	1.42 (1.00-2.03)	0.05	b	b	b	b
	Hispanic	480	0.96 (0.65-1.43)	0.85				
	Native	196	1.81 (1.19-2.76)	<0.01				
Self-Reported	No	3305	1.00		No	431	1.00	
Injury	Yes	218	1.59 (1.06-2.38)	0.03	Yes	67	2.19 (1.14-4.20)	0.02
How Many	Nonsmokers	2166	1.00					
Cigarettes 30	10 or less	367	1.49 (1.03-2.15)	0.03				
Days Before	10-20	582	1.41 (1.02-1.96)	0.04	c	c	c	c
BCT	20 or more	408	1.74 (1.23-2.47)	<0.01				

[a]CI is confidence interval.
[b]Did not reach the final step in the backward-stepping multivariate analysis.
[c]Not entered into the model because it did not meet the p<0.10 criteria in the univariate analysis.

8. DISCUSSION.

a. General Findings.

(1) One of the main findings of the present study was that self-reported injury, cigarette use, and the 2-mile run were associated with a higher risk of injury in all four of the injury categories (except for the 2-mile run in the traumatic injuries category). For women, self-reported injury and slower 2-mile run times were associated with a higher risk of injury in three of the four injury categories. Table 14 displays the variables from all four injury categories (multivariate Cox regression analysis) associated with a higher risk of injury for men and women. It is interesting that only men were associated with a higher risk of injury relative to cigarette use and lower sit-up performance, and only women were associated with a higher risk of injury relative to attendance at basic training at Fort Leonard Wood. In most categories (excluding traumatic time loss), both men and women had higher injury risk if they had a self-reported injury or lower performance on the 2-mile run.

Table 14. Risk Factors From All Four Injury Categories Placing Soldiers at a Higher Risk for a Time-Loss Injury (Multivariate Analysis)

Variables	Variable Level	Men				Women			
		Time Loss	Overuse Time Loss	Lower Extremity Overuse Time Loss	Traumatic Time Loss	Time Loss	Overuse Time Loss	Lower Extremity Overuse Time Loss	Traumatic Time Loss
Age Group							X		
	17-19						X		
	20-24								
	25+								
Military Occupational Specialty			X						
	Track Vehicle Repairer (63H)								
	Wheeled Vehicle Repairer (63W)								
	Self-Propelled Field Artillery System Mechanic (63D)								
	Fuel and Electrical System Repairer (63G)		X						
	Track Vehicle Mechanic (63Y)		X						
Race		X			X	X			
	Caucasian								
	Asian								
	Black				X	X			
	Hispanic								
	Native	X			X				
Basic Training Site									
	Ft Jackson								
	Ft Knox								
	Ft Wood							X	
	Ft Benning								
	Ft Sill								
Self-Reported Injury		X	X	X	X	X	X		X
Cigarette Use		X	X	X	X				
	Nonsmoker								
	>10	X			X				
	10-20	X	X	X	X				
	20 or more	X	X	X	X				
Sit-Ups		X	X						
2-Mile Run		X	X	X		X	X	X	

(2) The relative risk for time-loss injuries was 1.74 times higher for women when compared to men, which is in agreement with studies performed during BCT.[9,11] For time-loss injuries, the findings were injury incidence rates of 34.9/10,000 person-days for men and 60.8/10,000 person-days for women. A comparison of the rates found in

an investigation of the Army Combat Medic AIT course showed that men had a similar injury incidence rate of 34.2/10,000 person-days which was about the same as the current study. However, women in the Army Combat Medic course had an injury incidence rate of 42.8/10,000 person-days which is much lower than the Ordnance School injury incidence rate of 60.8/10,000 person-days.[6] The rates in the Army Combat Medic AIT course were calculated assuming everyone completed the 10-week course. The higher injury incidence rates seen for women in the Ordnance School could be a result of the different types of training involved in the Ordnance School curriculum compared to the Army Combat Medic AIT course. In the Ordnance School, women are required to perform mechanical work on heavy equipment which requires more muscle mass and strength when compared to the training involved in the Army Combat Medic course. Also, when examining tobacco use for women, 34 percent of those in the Army Combat Medic AIT reported tobacco use within the last year compared to 41 percent of women in the current study who reported using tobacco (cigarettes) within the last 30 days. The specificity of the training in the Ordnance School requiring greater amounts of strength and the increase in tobacco use could be partially responsible for the higher injury incidence in women in the Ordnance School when compared to Army Combat Medic AIT.

b. Age.

(1) Younger age (17-19 years) was independently associated with a higher risk of injury for women when compared to slightly older women (20-24 years). Other investigations during BCT and AIT have shown that older recruits are at a higher risk of being injured.[6,10,13,35] It has been suggested that when younger and older trainees all train at similar frequencies, intensities, and durations (as in AIT), the older trainees are at a greater risk of injury because of age-related fitness factors.[10] With aging, there is a decrease in run speed and muscular endurance (which occurs around 30 years old), in addition to a decrease in lung vital capacity and aerobic capacity. These declines may contribute to the higher likelihood of injury.[4,36]

(2) The civilian literature is inconsistent when investigating the association between age and injury, with some studies of physically active individuals showing no association, while other studies indicated that older age was associated with injury.[37-43] Therefore it is unclear why the younger age group would be at a higher risk of injury when compared to a slightly older group who would also not be affected by any age-related fitness factors. Although when examining self-reported injury that may have an effect on AIT performance, 48 percent of 17-19-year-olds answered yes to this question compared to 33 percent of 20-24-year-olds.

c. Race.

(1) Native American men had a higher injury risk for time-loss injuries and traumatic time-loss injuries compared to Caucasians. One explanation could be that Native Americans have been shown to have a higher prevalence of tobacco use (cigarettes) compared to other ethnic groups.[44,45] Tobacco use (cigarette smoking) has been shown to increase injury rates in BCT.[13,35,46-48] However, in the current study the prevalence of cigarette use was higher in Caucasians (50 percent) compared to Native Americans (41 percent).

(a) When examining the reporting of no leisure time physical activity and ethnicity, one study found that 46 percent of Native Americans engaged in no leisure time physical activity compared to 36 percent of Caucasians, while another study found 33 percent of Native Americans report no leisure time physical activity compared to 28 percent of other racial/ethnic groups.[45,49] However, physical activity levels in an AIT group would be similar after the completion of BCT. Although, the decreased leisure time physical activity prior to BCT might have predisposed Native Americans to a higher risk of injury during BCT which then carried over into AIT.

(b) In a study investigating risk-taking behaviors in Native Americans compared to Caucasians and African Americans, investigators found that male Native Americans reported higher rates of risk taking on 8 of 11 risk indicators.[50] This risk-taking behavior may manifest as a higher injury risk in AIT. Risk taking might be expected to increase traumatic injury rate more than overuse injuries, and, in fact, an increase in traumatic injury risk was seen in the present study. This may be at least a partial explanation for the increased injury risk in Native Americans when compared to Caucasians.

(2) Black men had higher injury risk for traumatic injuries compared to Caucasian men. In previous studies, Black men had a higher prevalence of lower extremity tendon injuries. In a study examining 865 U.S. military members who underwent Achilles tendon repair, the researchers found that Blacks had an overall increased risk of 4.2 (95 percent CI:3.6–4.7) for undergoing repair, when compared with non-Blacks.[51] Another study (using data from 2000–2004 from the U.S. Defense Medical Epidemiology Database) found that, compared with Caucasian Service members, Black Service members had an adjusted rate ratio for quadriceps tendon tears of 2.9 (95 percent CI:2.4–3.4), patellar tendon tears of 4.5 (95 percent CI:3.9–5.2), and Achilles tendon tears 3.6 (95 percent CI:3.3–3.9).[52] In a biomechanical study of the viscoelastic characteristics in the tricep surae between Black and Caucasian athletes, Black athletes were found to have a significantly greater muscle viscosity and muscle stiffness, which could result in tissue that is more likely to undergo failure if subject to sufficient trauma.[53] On the other hand, Blacks are less likely to experience stress fractures,

compared with Caucasians, possibly because Blacks having a higher bone density.[54-56] Other studies performed during BCT and AIT have shown no differences when examining race and injury risk.[6,10,24] The present study cannot determine why Black men reported more injuries than Caucasians, but the factors above may be worth exploring in future studies.

(3) Caucasian women had a higher risk of time-loss injuries compared to Black women. Other studies also suggest that Caucasian women have a higher risk of training injuries and stress fractures than other ethnic origins.[10,54,57,58] In a study investigating knee-related disability among enlisted women in the U.S. Army, investigators found that non-Caucasian women had a 50 percent lower risk of knee-related discharge relative to Caucasian women.[59] In another study, investigators found that African American women had fewer blisters on their feet compared with Soldiers of other ethnicities.[26]

d. Basic Training Site.

(1) For women, those arriving from Fort Leonard Wood had a higher injury rate when compared with those from Fort Jackson. The Service members arriving from Fort Jackson may have had a lower risk of being injured due to the multiple injury-reduction interventions introduced at that training facility.[5] In 1998, the commander of the Fort Jackson Training Center increased the emphasis on reducing injury rates, and the USACHPPM established an injury coordinator position to provide state-of-the-art advice and material support to commanders and drill sergeants for reducing injury rates. Program monitoring from surveys and a Physical Training and Rehabilitation Program Surveillance System (a surveillance system developed by the Physical Therapy Department at Moncrief Army Community Hospital, Fort Jackson, to track injury information) suggests that these interventions were associated with a reduction in injury rates. Further, several other epidemiological consultations and studies have been performed at Fort Jackson, which may have raised awareness of injury prevention measures and subsequently reduced injury rates.[8,11,13,16,20, 21,24]

(2) However, in the univariate analysis for time-loss injuries, men arriving from Fort Jackson had a higher injury rate when compared to those from Fort Knox. When examining previous self-reported injuries and tobacco use, there were no differences between Fort Jackson and Fort Knox. However, there was a small difference in muscular endurance and 2-mile run times with Fort Jackson having an approximate increase of 5 percent more Soldiers in the lowest quartiles for push-ups and sit-ups and slower 2-mile run times when compared to Fort Knox. This could be a partial reason for

the higher risk of injury for men arriving from Fort Jackson compared to those from Fort Knox.

e. Military Occupational Specialty. For men, injury risk was higher for the MOS of fuel and electrical systems repairer (63G) and the MOS of track vehicle mechanic (63Y) when compared to track vehicle repairer (63H). All three of these specialties have a "physical demands" rating of very heavy which means that on occasion men will have to lift over 100 pounds with frequent or constant lifting of in excess of 50 pounds. Also, all the men in these specialties perform repairs or maintenance on wheeled or tracked vehicles. When investigating current self-reported injury, tobacco use, and physical fitness scores among the three specialties, there were no differences. It is unclear why the MOS of fuel and electrical systems repairer and the MOS of track vehicle mechanic are at a higher risk of overuse injury when compared to the MOS of track vehicle repairer, when all three occupations have similar job objectives.

f. Self-Reported Injury.

(1) Injury risk in AIT was associated with current injuries perceived by the Soldier to have a negative effect on AIT performance. For men, injury risk for those with self-reported injuries in AIT was approximately 2.2 times higher for all injury categories (except traumatic injury (1.6)) and 1.5 times higher for women (except traumatic injury (2.2)). In answering this question, the Soldiers' perception of injury limitations could have been influenced by the anticipation of the tasks they were required to perform as part of their MOS which can vary in terms of physical demands and duration of training. Therefore, if the Soldiers had an injury, it may or may not have affected their performance, but they could only answer this question as to how they perceived the level of difficulty associated with their MOS. Other factors that may have also influenced an individual's perceived threat of injury could include age, gender, ethnicity, education, personality and peer pressure. Previous injury, both overuse and traumatic, have also been shown to place Soldiers at a higher risk of re-injury[10,60,61] In one study, having a traumatic injury increased the risk of subsequent injury by 83 percent when compared to having an injury categorized as an overuse injury or unspecified pain.[62]

(2) In civilian studies, investigators have shown that those who sustained an injury (both traumatic and overuse) within the last year, as well as those who sustained a current injury, had a higher risk of re-injury than those who reported no previous or current injuries.[38,63-67] In a study investigating low back pain as a risk factor for recurrent injuries in varsity athletes, researchers found that athletes who reported a previous low back injury were at a three times greater risk and athletes who reported current back pain were at a six times greater risk of sustaining a lower back injury.[67] It

is possible that previous or current injuries may not be the cause of subsequent injuries if the former are treated adequately. In a study investigating re-injury rates of amateur male soccer players, researchers found an 11 percent re-injury rate for a coach-controlled rehabilitation group (coaches received a 10-step rehabilitation program to implement as a guide for functional rehabilitation after an injury occurred) compared to a 29 percent re-injury rate for the control group (coaches were instructed to go on with training and management of injuries as usual).[68]

(3) In the present study, Soldiers were asked to report on injuries believed to affect AIT training. Soldiers who answered affirmatively may or may not have sought out medical attention for those specific injuries, or the injury may have increased susceptibility to other injuries. Other studies have demonstrated that inadequate rehabilitation and a premature return to competition are risk factors for reinjury.[31,69,70]

g. Cigarette Use.

(1) For men, injury risk was higher in smokers than nonsmokers and demonstrated a dose-response relationship in which injury risk increases with the number of cigarettes smoked per day. Previous studies have also demonstrated an increased risk of injury in smokers compared to nonsmokers, the number of cigarettes smoked per day, and risk of musculoskeletal injury.[5,13,35,46-48,71-74] The relationship between tobacco use and injury may be due to a compromised ability to repair damaged tissues, thereby increasing susceptibility to the repetitive microtrauma that presumably causes overuse injuries.[75] In a study examining the healing of tibial fractures, investigators found that healing time to clinical union was 166 ± 92 days for smokers verses 134 ± 71 days for nonsmokers (a 24 percent slower healing time). Possible attributes of the delayed time to clinical union could be decreased oxygen saturation levels and/or impaired blood flow to the injured area in smokers.[76] In examining the healing of wounds, researchers found that 5 out of 15 patients who underwent intraoral bone grafting with simultaneous implant placement experienced impaired wound healing. Of these five, four admitted to smoking in the preoperative period. Vasoconstriction of the tissues due to nicotine was one of the suggested causes of the delayed healing.[77] Therefore, the constant physical stressors of AIT training may result in weaken tissues from training and overuse, which may cause a greater susceptibility of injury in smokers.

(2) For traumatic injuries, the relationship between tobacco use and musculoskeletal injury may be due to greater risk-taking behaviors. In an Air Force study, recruits who were cigarette smokers had higher scores than nonsmokers on various measures of risk taking. These included an overall measure of risk-taking, in

addition to greater rebelliousness, less seat belt use, more risky sex, a more favorable view of illegal drug use, more alcohol use, more binge drinking, less physical activity, less intake of fruits and vegetables, and greater intake of high fat foods.[32]

(a) In civilian studies, smokers had more motor vehicle accidents, more traffic violations, less seat belt use, less physical activity, more alcohol consumption and lower intake of fruits and vegetables compared to nonsmokers.[78-80]

(b) Another hypothesis to explain the association between injuries and tobacco use may be due to a decrease in fatigue resistance. In a study investigating musculoskeletal fatigue and smoking history, investigators found that the skeletal muscle of smokers was more fatigable than that of older and physically active matched nonsmokers.[81] The authors suggested that smoking may have an acute and reversible effect on skeletal muscle fatigability caused by carbon monoxide in cigarette smoke. Carbon monoxide can reduce the oxygen content of the blood by binding to the oxygen sites of the hemoglobin which then diminishes oxygen delivery and results in oxygen being released at a slower rate to the tissues.[82] In smokers, carboxyhemoglobin may reach levels of 9 percent.[82]

(c) Other investigators have found that fatigue leads to decrements in proprioceptive ability, a decrease in joint stability, and alterations in muscle activity which can then possibly lead to a higher risk of injury.[83,84]

h. Smokeless Tobacco Use.

(1) For men, risk of injury among frequent smokeless tobacco users was higher than among non-users. In a study investigating injury proneness in infantry conscripts, investigators found that smokeless tobacco placed conscripts at a 2.4 times higher risk of injury than non-smokeless users.[35] In another study investigating tobacco use and injury risk among military parachutists, investigators found that smokeless tobacco users had a 50 percent greater odds of injury than non-smokeless users (although the association was not statistically significant at the .05 level).[85] It has been demonstrated that concentration levels of nicotine and cotinine in the blood are similar in cigarette and smokeless tobacco users.[86,87] Therefore, any harmful effects of nicotine exposure related to cigarettes would also be an expected hazard of smokeless tobacco.

(2) As noted earlier, one of the effects of nicotine is vasoconstriction of the tissues which has been suggested to lead to delayed healing.[77] When examining the effects of smokeless tobacco on the cardiorespiratory response to submaximal exercise, investigators have found an increase in heart rate as well as a decrease in

stroke volume after their subjects used smokeless tobacco compared to a placebo group.[88] Investigators also found increased plasma lactate concentration levels at any given submaximal oxygen uptake after their subjects used smokeless tobacco, which is suggestive of a greater demand for glycolytic energy production.[88] Faster heart rates and greater use of glycolytic energy sources during submaximal exercise could then lead to fatigue and a higher risk of injury. However, other studies have shown that nicotine does not influence the perception of exertion at low intensity exercise, that long-term use of smokeless tobacco does not influence exercise capacity in healthy and physically well-trained subjects, and that smokeless tobacco has no effect on reaction time.[89-91] It is possible that the increased risk of injury associated with smokeless tobacco use could be attributed to a number of different conditions.

(3) In summary, long-term effects of smokeless tobacco could lead to slower healing times, with acute effects to include fatigue due to an increased heart rate, a greater dependence on blood glucose as fuel during rest and sub-maximal exercise, and a delay in the nervous transmission across the neuromuscular junction.[88,92,93]

i. Muscular Endurance. Time-loss injury risk was higher for Soldiers who had poor muscular endurance (push-ups and sit-ups), which has also been shown to be associated with injuries in BCT.[10,11,13,24,72,94,95] Many tasks performed in BCT and AIT require muscular endurance of the upper body. Lack of muscular endurance could lead to fatigue and a greater reliance on different muscle groups as the active muscles begin to fatigue.[96,97] This unaccustomed stress may increase the risk of injury.

j. Two-Mile Run Times. Injury risk for the slowest 2-mile run times was higher for men and women when compared to the fastest 2-mile run times. Previous studies investigating run times during BCT have also found that slower run times place Soldiers at a higher risk of injury.[4,11,13,17,98] The Soldiers with the slowest 2-mile run times would have lower aerobic capacities than those with the fastest 2-mile run times.[99] Soldiers with lower aerobic capacities will likely experience greater physiological stress and/or fatigue during AIT tasks (such as running, cross-training and calisthenics) due to exercising at a higher percentage of their maximum aerobic capacity when compared to Soldiers with greater fitness levels. Soldiers of lower fitness levels will not only be exercising at a higher percentage of their aerobic capacity to accomplish the same task as a more fit Soldier, but they will also perceive tasks as more difficult.[100] The greater physiological stress and/or fatigue experienced may lead to a higher risk of injury. Studies on fatigue have demonstrated decrements in proprioceptive ability; a decrease in joint stability; alterations in muscle activity; and changes in gait, balance, low frequency fatigue, neuromuscular function, and ligament laxity.[83,84,101-110]

9. CONCLUSIONS. This study identified risk factors for time-loss injury in Ordnance School AIT Soldiers. Overall, 31 percent of men and 54 percent of women involved in the project incurred at least one time-loss injury. When examining injury risk for all four injury categories, both cigarette use and self-reported injury were associated with a higher risk of injury in men. For three out of the four injury categories, self-reported injury (women), sit-ups (men), and the 2-mile run (men and women) were associated with a higher risk of injury.

10. RECOMMENDATIONS. In an effort to reduce injuries, surveillance and tracking of injuries in AIT Soldiers could alert commanders to elevated levels of injuries or to injury outbreaks. Smoking cessation classes and fitness training prior to entry are potential strategies to reduce injuries.

11. TECHNICAL ASSISTANCE. Direct inquiries regarding this report to Mr. Tyson Grier, Project Officer, Injury Prevention Program, Directorate of Epidemiology and Disease Surveillance, at commercial (410) 436-5450, DSN 584-5450, or email to tyson.grier@us.army.mil.

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APPENDIX A

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APPENDIX B

QUESTIONNAIRE FOR ORDNANCE SCHOOL SOLDIERS (EXAMPLE)

58295

Soldier Health Inprocessing Sheet, revised 7Jun01
ALL SOLDIERS FILL OUT THE FOLLOWING

1. Today's Date (DD-MM-YY) ☐☐ - ☐☐ - ☐☐

3. Last Name ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐

4. First Name ☐☐☐☐☐☐☐☐☐☐☐☐☐☐

5. Grade E☐ or O☐ (E = Enlisted, O = Officer)

6. Race
- ☐ Asian American
- ☐ African American
- ☐ Caucasian American
- ☐ Hispanic American
- ☐ Native American
- ☐ Other American

7. Gender
☐ Male ☐ Female

8. Date of Birth (DD-MM-YY) ☐☐ - ☐☐ - ☐☐

9. Age ☐☐

10. Unit Assigned to:
☐ A (16th) ☐ B (16th) ☐ C (16th) ☐ D (16th) ☐ E (16th) ☐ A (143rd) ☐ B (143rd) ☐ C (143rd)

11. Basic Training Site:
☐ Ft. Jackson ☐ Ft. Knox ☐ Ft. Leonard Wood ☐ Ft. Benning ☐ Ft. Sill ☐ Other ☐☐☐☐☐☐☐☐

12. Do you presently have an injury that would adversely affect your performance during AIT?
☐ Yes ☐ No

13. Do you presently have an illness that would adversely affect your performance during AIT? ☐ Yes ☐ No

14. If your answer to Question #12 or #13 is Yes, what area of the body does the injury or illness affect?
- ☐ General Health
- ☐ Eyes
- ☐ Head
- ☐ Shoulder
- ☐ Arm
- ☐ Hand
- ☐ Neck and Upper Back
- ☐ Chest
- ☐ Lower Back
- ☐ Hip and Upper Leg
- ☐ Knee
- ☐ Lower Leg
- ☐ Ankle
- ☐ Foot
- ☐ Other ☐☐☐☐☐☐☐☐☐☐

15. When were you injured?
☐ Prior to BCT ☐ During BCT ☐ After BCT

16. When did your illness begin?
☐ Prior to BCT ☐ During BCT ☐ After BCT

17. In the space provided, tell us why you may need to see the doctor:

18. Did you smoke 1 or more cigarettes in the 30 days before Basic Training? ☐ Yes ☐ No

19. Did you smoke on 20 or more days in the 30 days before Basic Training? ☐ Yes ☐ No
If yes, how many cigarettes?
- ☐ 10 or fewer cigarettes per day on average
- ☐ 10-20 cigarettes per day on average
- ☐ 20 or more cigarettes per day on average

20. Did you use smokeless tobacco (chewing, snuffing, pinching, etc.) at least once in the 30 days before Basic Training? ☐ Yes ☐ No

21. Did you use smokeless tobacco (chewing, snuffing, pinching, etc.) on 20 or more days in the 30 days before Basic Training? ☐ Yes ☐ No
If yes, how much?
- ☐ Less than 1 can, pouch, or plug per day on average
- ☐ 1 can, pouch, or plug per day on average
- ☐ 2 or more cans, pouches, or plugs per day on average

FEMALES ONLY:

22. Have you had a PAP smear in the last year? ☐ Yes ☐ No
If yes, were the results abnormal? ☐ Yes ☐ No

APPENDIX C

INJURY SHEET FOR CLINICIANS (EXAMPLE)

Draft

Injury Sheet
revised June 2001

Last Name ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐

Today's date (DD/MM/YY) ☐☐ - ☐☐ - ☐☐

Gender: ☐ Male ☐ Female

Unit: ☐ A (16th) ☐ B (16th) ☐ C (16th) ☐ D (16th) ☐ E (16th) ☐ A (143rd) ☐ B (143rd) ☐ C (143rd) ☐ Permanent Party ☐ USMC ☐ USAF ☐ ANCOC ☐ BNCOC ☐ Other

1. Cause Codes (check one)
- ☐ Sports
- ☐ Running
- ☐ PT (other than running)
- ☐ Road March
- ☐ Environmental (heat,cold)
- ☐ Fall
- ☐ Work Related
- ☐ Fighting, anger-related
- ☐ Other ☐☐☐☐☐☐☐☐☐☐
- ☐ Unknown

2. Location (check one)
- ☐ Left
- ☐ Right
- ☐ Bilateral
- ☐ Other
- ☐ Unknown

3. Body Part (check one)
- ☐ Unknown
- ☐ Other

Head
- ☐ Ear
- ☐ Eye
- ☐ Nose
- ☐ Neck
- ☐ Face, NOS
- ☐ Head, NOS

Shoulder
- ☐ Clavicle
- ☐ Shoulder, NOS

Arm
- ☐ Arm, NOS

Elbow
- ☐ Elbow, NOS

Forearm
- ☐ Wrist
- ☐ Forearm, NOS

Hand
- ☐ Metacarpal
- ☐ Finger, NOS
- ☐ Hand, NOS

Hip
- ☐ Gr. trochanter
- ☐ Femoral neck
- ☐ Hip, NOS

Leg (Upper)
- ☐ Quadriceps
- ☐ Hamstring
- ☐ Femur
- ☐ Upper leg, NOS

Leg (Lower)
- ☐ Tibia
- ☐ Fibula
- ☐ Gastrocnemius muscle
- ☐ Lower leg, NOS

Knee
- ☐ Medial collateral ligament
- ☐ Lateral collateral ligament
- ☐ Anterior cruciate ligament
- ☐ Posterior cruciate ligament
- ☐ IT Band
- ☐ Medial meniscus
- ☐ Lateral meniscus
- ☐ Other meniscus
- ☐ Patella
- ☐ Patella tendon
- ☐ Patellofemoral joint
- ☐ Tibial plateau
- ☐ Knee, NOS

Ankle
- ☐ Achilles
- ☐ Lateral ligament
- ☐ Medial ligaments
- ☐ Ankle, NOS

Foot
- ☐ Metatarsal
- ☐ Pes planus
- ☐ Pes cavus
- ☐ Plantar fascia
- ☐ Sesmoid
- ☐ Toe, NOS
- ☐ Foot, NOS

Back & Spine
- ☐ C-spine area
- ☐ T-spine area
- ☐ L-spine area
- ☐ Back or spine, NOS

Rib
- ☐ Rib, NOS

4. Injury Category (check one)
- ☐ Overuse
- ☐ Traumatic
- ☐ Other
- ☐ Unknown

5.Type of Injury (check one)
- ☐ Normal exam
- ☐ Abrasion/Laceration
- ☐ Arthritis
- ☐ Bursitis
- ☐ Contusion
- ☐ Dislocation
- ☐ Fasciitis
- ☐ Fracture
- ☐ Ingrown toenail
- ☐ Instability
- ☐ Muscle spasm
- ☐ Neuropathy
- ☐ Osteochondral defect
- ☐ Pain
- ☐ Radiculopathy/Radiculitis
- ☐ Rupture
- ☐ Shin splints
- ☐ Strain
- ☐ Spondylosis
- ☐ Sprain
- ☐ Stress fracture
- ☐ Stress reaction
- ☐ Synovitis
- ☐ Subluxation
- ☐ Tendinitis
- ☐ Tear
- ☐ Other ☐☐☐☐☐☐☐☐☐☐
- ☐ Unknown

6. Type of Visit (check one)
- ☐ Initial Visit For This Injury
- ☐ Follow Up Visit For This Injury

7. Disposition (check one)
- ☐ No profile
- ☐ Profile
- ☐ Quarters
- ☐ Hospitalized
- ☐ Other
- ☐ Unknown

8. Number of Profile or Quarters Days
- ☐☐ DAYS
- ☐ EPTS (recommended)
- ☐ MEB

9. Consultation (check one)
- ☐ None
- ☐ Orthopedics
- ☐ Podiatry
- ☐ Physical Therapy
- ☐ Gen surgery (cast clinic)
- ☐ Other

Record only *one* injury (the most serious).